nsca

CLEAN AIR

AND ENVIRONMENTAL PROTECTION

SPRING 1994

Volume 24 **Number One**

NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION

Graseby Andersen
are now manufacturing
environmental monitoring instruments
in the UK for:

PM10
particulates
& VOCs

Phone us now on 0689 877767
for an information pack on ambient
and stack monitoring applications

GRASEBY
ANDERSEN

GRASEBY ANDERSEN LIMITED
RIVER HOUSE, LAGOON ROAD, ST. MARY CRAY, ORPINGTON, KENT UK BR5 3QX
TEL: 0689 877767 FAX: 0689 876661

SPRING 1994
VOLUME 24
ISSN 0300-5734

CLEAN AIR

Publishing Director:
Dr. Tom Crossett
Secretary General, NSCA

Editor:
Loveday Murley

Assistant Editor:
Mary Stevens

Information/PRO:
Tim Brown

Advertising:
Peter J. Mitchell
Rates on request.

CLEAN AIR is the official journal of the Society but the views expressed in contributed articles are not necessarily endorsed by the Society.

CLEAN AIR is issued free to Members and Representatives of Members.

CLEAN AIR Subscription for 1993 — £22.50

Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements are made.

CLEAN AIR is printed and published in England by the National Society for Clean Air and Environmental Protection,
136 North Street
Brighton BN1 1RG
Tel: Brighton (0273) 326313
Fax: Brighton (0273) 735802

CONTENTS

Editorial 3

NSCA News and Views
— Environmental Protection (Prescribed Processes and Substances) Regulations 1991 5
— IPC — Upgrading Existing Plant 6
— Draft Noise Insulation Regulations for New Railways 7
— Diesel Vehicle Emissions and Urban Air Quality 8
— News from NSCA Divisions 8
— List of NSCA Replies to Consultation Documents, January-February 1994 9

Reports
— UV-B and Ozone Levels in Europe and Britain, Professor Malcolm Fox 10
— Exhaust Watch: The Westminster Initiative Way, Chris Cawley 13
— The Challenge of the EC's Fifth Environmental Action Plan, Adrian J. Wilkes 19

Update 22

Books and Reports 34

Future Events 37

Index to Clean Air, Vol.23, 1993 40

Advertisers
— Graseby Andersen cvr ii
— Coalite Smokeless Fuels cvr iii
— Enviro Technology Services Plc cvr iv

NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

(Founded 1899)

Registered Charity, Number 221026

PRESIDENT
Professor The Lord Lewis, KT, FRS
IMMEDIATE PAST PRESIDENT
The Baroness Platt of Writtle, CBE, DL, FEng
VICE-PRESIDENTS
Mr. K. Collins, MEP; The Rt. Hon. The Earl of Cranbrook, DSc, DL;
Wayne David, MEP; John Edmonds; Dr. Caroline Jackson, MEP; Robert Jones,MP;
Air Commodore John Langston, CBE; Sir John Mason, CB, DSc, FRS;
The Rt Hon Lord Nathan; Sir Hugh Rossi; Mr. J. Speirs;
Gareth Wardell, MP
CHAIRMAN OF COUNCIL
Mr. K.G. Kaufman
DEPUTY CHAIRMEN OF COUNCIL
Cllr Dr. J.R.P. Evans, Mr. G.W. Barrett
IMMEDIATE PAST CHAIRMAN OF COUNCIL
Professor J.S. Harrison
HONORARY TREASURER
Mr. R. Hill
SECRETARY GENERAL
Dr. R.N. Crossett

HONORARY SECRETARIES OF NSCA DIVISIONS

Scottish Division: Calum MacDonald — Telephone: 041 227 5552
City of Glasgow DC, Environmental Health Dept.,
23 Montrose Street, Glasgow G1 1RN

Northern Ireland Division: Mervyn Fleming — Telephone: 0232 401805
67 Kilwarlin Road, Hillsborough, Co. Down BT26 6EA

Northern Division: Keith Atkinson — Telephone: 0325 352692
30 Loraine Crescent, Darlington, Co. Durham DL1 5QU

North West Division: R.N. Turner — Telephone: 051 443 4731
45 Down Green Road, Harwood, Bolton BL2 3QD

Yorkshire & Humberside Division: Stephen Carden — Telephone: 0924 295391
Head of Health, City of Wakefield MDC, 29 King Street, Wakefield WF1 2SY

West Midlands Division: J. Sweetland — Telephone: 0952 202558
Senior EHO, Pollution Control, Wrekin Council, Civic Offices, PO Box 212, Telford TF3 4LB

East Midlands and Eastern Divisions: D.R. Romaine — Telephone: 0332 255228
Derby City Council, Housing and Environmental Services Dept., The Council House, Corporation Street, Derby DE1 2FD

South East Division: J.J. Beagle — Telephone: 081 452 0203
19 Oxgate Gardens, Brent, London NW2 6EA

South West Division: J.A. Jefferies — Telephone: 0272 223343
Environmental Health Services, Bristol City Council, Brunel House, St. Georges Road, Bristol BS1 5UY

South and Mid Wales Division: T. Jones — Telephone: 0495 766775
28 Maes-y-celyn, Griffithstown, Pontypool, Gwent

EDITORIAL

A STEP IN THE RIGHT DIRECTION?

We welcome the concept of the UK Strategy for Sustainable Development and the plans and programmes which were published simultaneously. We welcome the commitment to open, public debate and choice. We are disappointed by the substance of the 567 pages which became freely available in January to those who can afford £57. We are disappointed by the speed at which the debate is getting under way and the level at which it is being conducted. We are disturbed by the degree of complacency which pervades the official papers.

Launching the Strategy the Secretary of State for Environment recognised that a fundamental change in our lifestyles was necessary if we are to protect the world for future generations. The documents that followed give only a very vague indication of what will be needed either in terms of individual measures or the combinations of these measures which are most likely to be sustainable. Quantitative information on the consequences of choice is equally sparse.

It is as if it were only necessary to publish a menu to secure universal choice of a healthy diet. Fast and sensible progress in the great debate which Ministers would like to foster seems especially improbable because the glossy environmental menu which has just been put on the table tells us little about calories, nutrients, vitamins or prices.

The Strategy tells us for example:

> *"It is not the Government's job to tell people where and how to travel. But if people continue to exercise their choices as they are at present and there are no other significant changes, the resulting traffic growth would have unacceptable consequences for both the environment and the economy of certain parts of the country. . . ."*

Such masterly understatement of the consequences of realisation of the national road traffic forecast is unlikely to persuade us to vote for measures which will enable or motivate us to moderate our motoring binge. The constrained discussion of transport in the UK Strategy contrasts markedly with its broad treatment in Blueprint 3 (Review p36). Professor Pearce and his colleagues examine the reasons why the external and environmental costs of road transport have been largely ignored in the past and discuss how economic measures and regulation might be combined in policies which should at least get us on the road to sustainability.

Not everyone would agree with the figures in Blueprint 3 but they do provide a basis for discussing tradeoff and pain as well as pleasure and profit. As the debate progresses it may be that Government will have to tell some people to do or not to do some things. The sooner we know the better, and to shrink from proposing targets or facing the facts at this stage will only increase the ultimate pain.

NSCA ENVIRONMENTAL PROTECTION 94
Annual Conference and Exhibition
Monday 24 to Thursday 27 October 1994
The Winter Gardens - Blackpool

Conference themes
Sustainability, Managing Waste and Energy
Vehicle Emissions
Environmental Quality for Health
Noise
Environmental Quality Management
Environmental Auditing and Reporting
plus
parallel Technical and Exhibitor Presentations

Conference brochure will be available in May

National Society for Clean Air and Environmental Protection
136 North Street - Brighton BN1 1RG
Tel: 0273 326313 Fax:0273735802

NSCA NEWS & VIEWS

ENVIRONMENTAL PROTECTION (PRESCRIBED PROCESSES AND SUBSTANCES) REGULATIONS 1991

Proposed Amendments – Second DOE Consultation Paper, December 1993

In its comments on the first (March 1993) consultation paper (see *Clean Air* Summer 1993), the Society expressed its concern that the review of SI 472 should not be taken as a signal to reduce the overall regulatory burden on industry. We agree the need to reduce ineffective regulation; in many circumstances voluntary and fiscal measures can produce environmental improvement more cost-effectively than regulation. However there is a continuing need for appropriate legislation, uniformly enforced. This will provide the level playing field which ensures that competitive firms are not penalised for taking measures which are not immediately profitable, to protect the environment. Legislation can also have technology-forcing effects which improve our international competitiveness.

Business surveys indicate that legislation and regulation remain the major spurs to improving environmental performance. It is disappointing to note that the proposals tend towards deregulation, even in circumstances where a clear majority of respondents favoured new regulations, or changes in regulations. Local authorities are unlikely to request additional duties and responsibilities under the EPA 1990 unless they consider they will prove to be more effective than current nuisance legislation. Recourse to statutory nuisance powers does not guarantee environmental protection. Significant pollution may be caused even where people may not be directly affected, or a nuisance may not be provable. In Scotland, the *Public Health (Scotland) Act 1897* provides an even less effective remedy. “Best practicable means” and “reasonable excuse” defences against statutory nuisance actions do not give the same consistency of enforcement as the requirement to meet the standards set by PG Notes under EPA 1990.

The desire to put a deregulatory “spin” on proposals wherever possible, despite well argued counter-proposals, can only call into question the depth of Government commitment to environmental protection. Taken as a whole, the amendments to SI472 will be beneficial, but some important opportunities have been lost. A particular disappointment is the failure to take on board any of the thirty-one suggestions for new inclusions to the regulations. One approach would be to give local authorities “adoptive” powers to extend the list of Part B processes at local level to deal with local problems, subject to agreement of appropriate guidance and approval by the Secretary of State. However we recognise that in the current political climate such a view is unlikely to find favour.

IPC — Upgrading Existing Plant

In its comments on the draft IPR notes for the metals sector circulated by HMIP in December, NSCA registered its strong concern about the apparent relaxation, in comparison with Notes already published, of the upgrading requirements for existing plant.

A central strength of the *Environmental Protection Act* is that it sets not only standards which are considered to represent BATNEEC for new plant, but also firm timetables by which existing plant must be upgraded to meet new plant standards. Current IPR Notes all use a variation of the formula: *"All existing processes should be upgraded to achieve the standards in this Note for new plant at the earliest opportunity and no later than. . .",* with a very limited possibility of derogation: *"only in exceptional circumstances should the deadline of. . .be extended and Inspectors should refer cases to the Chief Inspector where such action is proposed".*

IPR Notes thus provide a consistent benchmark — not just for new plant standards, but also a "hurdle" of specified height which all existing industries know they will have to jump at a specified time in the future. This has been a key element in creating a level playing field, assisting long-term investment planning and ensuring that similar demands are made of competing producers. Questions of interpretation have hitherto largely been confined to the period of run-up to the BATNEEC hurdle; the draft Notes under discussion now appear to give considerable latitude to setting the height and position of that hurdle with respect to individual plant in the Part A metal process sector (latitude that is not available for Part B metal processes).

Section 4.2.3 (common to all draft metal sector IPR Notes) states that existing processes should be upgraded *"with the aim"* of attaining new plant *"achievable releases"*, but Section 6.2.1 states that existing plant *"may be incapable of achieving"* such release levels. The preamble (Section 1.2) further states that *"separate standards of release levels for new and existing processes are indicated"* and that Inspectors *"should not impose"* achievable release levels as uniform standards.

Whilst we sympathise with the desire to allow a degree of flexibility to tailor emissions requirements to locality, we believe such flexibility should only operate over and above the agreed minimum standards contained in the relevant IPR Note, which must be met across the board. The consequential uncertainty of this new approach could produce competitive distortion both within and between industrial sectors, and is likely to work to the detriment of environmental protection. In particular, setting lower standards for existing processes is hardly likely to enhance the rate of uptake of cleaner technologies. We strongly recommend that the formula from previous IPR Notes is retained.

In the requirements for monitoring (in most Notes, 10.3.2, revised numbering from earlier versions) further guidance is required on the distinction between meeting air quality standards, and the possibility of *"serious damage to health"*. How should this be assessed?

In the following section, para 11.2.5 excludes start-up and shut-down from the period of compliance with continuous monitoring. This represents a weakening of compliance requirements; previous IPR Notes have included start-up and shut-down within the averaging period over which compliance should be assessed. Given the degree of flexibility allowed by the 95% compliance / 1.5% exceedance qualifier in para 11.2.4, we feel it appropriate to include start-up and shut-down within the averaging period. We also consider that the compliance qualifiers in para 11.2.4 should be noted "up front" alongside the release limits in para 6.2.1.

A copy of NSCA's comments on the specifics of the draft IPR Notes for the Metals Sector and on the draft Prescribed Processes and Substances Regulations is available from NSCA .

DRAFT NOISE INSULATION REGULATIONS FOR NEW RAILWAYS

Department of Transport, December 1993

The *Draft Noise Insulation (Railways and Other Guided Systems) Regulations* will amend the *Noise Insulation Regulations 1975.* Those responsible for new railway lines etc would have a duty to offer insulation or to pay a grant for rooms of dwellings exposed to a noise level of at least 68 $d(B)A_{LAeq\ 18hr}$ during the day (0600-midnight) and to 63 $d(B)A_{LAeq\ 6hr}$ at night.

In its initial comments on the 1990 consultation document on rail noise standards (see *Clean Air*, Summer 1990), the Society noted that studies undertaken for Kent County Council and the London Borough Consortium had both reached very similar conclusions about appropriate standards for noise insulation. The standards proposed were

Day	L_{Aeq}	65	dB(A)
Evening	L_{Aeq}	60	dB(A)
Night	L_{Aeq}	55	dB(A)

We endorsed these standards at the time and are unaware of any new evidence to contradict the findings.

The Society is keen to see convergence of noise standards for rail and road. The Batho Report recommended a review of the 68 $dB(A)L_{10}$ 18hr threshold for road noise insulation eligibility, possibly to 65 $dB(A)L_{10}$ 18hr. We understand that this is still subject to research by TRL; it would be invidious to set rail thresholds by reference to what will in all likelihood become an obsolete figure. The opportunity should be taken now to anticipate improving standards. We are thus disappointed that the DOT proposals are significantly weaker than the Kent and London proposals, and would urge that further consideration is given to the latter.

We are also disappointed that no action is to be taken on the proposals for an 85

L_{Amax} maximum noise level. As is seen with aircraft noise one or two extremely noisy events, which can be very disturbing at night, may not be fully reflected in an L_{Aeq} figure. Similarly the decision to take a six hour interpretation of night time noise, rather than the eight hours recommended by the Mitchell Committee, is to be regretted.

DIESEL VEHICLE EMISSIONS AND URBAN AIR QUALITY

In commenting on the second report from the quality of Urban Air Review Group (QUARG), NSCA said its recommendations were likely to reverse the swing towards diesel as an environmentally-friendly fuel. The report published in January (see Update section this edition of *Clean Air*) views the growth of the diesel car fleet "with considerable concern".

However NSCA pointed out that the majority of diesel emissions come from heavy duty HGVs and buses rather than cars. When comparing diesel cars with petrol-catalyst equivalents the disadvantages of diesel are less clear-cut.

There is no overall winner. Diesel beats petrol on carbon monoxide, hydrocarbons — including benzene — and carbon dioxide, but is worse on nitrogen oxides and much worse on particulates said NSCA. Because of the advisory group's focus on urban air quality, the advantages of diesel from a global warming perspective are played down.

NSCA was disappointed that no attention is given to the question of enforcement. The distinction between petrol and diesel cars is probably less significant than the distinction between a well-tuned or badly tuned vehicle of either type. In particular, when catalyst systems malfunction, considerable pollution can be caused without the driver's knowledge. It is therefore a priority to establish a 'green police force' to detect those grossly polluting vehicles — diesel or petrol — which produce most of the pollution, whilst they are in use on the road. The technology to do this is available, but the Government has shown no interest in adopting it.

NEWS FROM NSCA DIVISIONS

Scottish Division

Due to ill health the Divisional seminar planned for 16 December 1993 had to be postponed. This has now been re-arranged for 23 June 1994 and will take place at the Heriot-Watt University Conference Centre, Ricarton, Edinburgh. The morning session will cover energy and the environment and the afternoon session will look at environmental assessment. For more details contact Mrs. Clare Carruthers, Tel: 041-227 5552.

South East Division

The Division's 1994 Annual General Meeting will be held on Tuesday 24 May at 2.00

p.m. at British Coal, Grosvenor Place, London SW1. Following the AGM Mr. Peter Mudie, Regional Programme Director of Business in the Environment will address the meeting. BiE's mission is to devise and promote practical steps in applying the principles of sustainable development through action and partnership between business and the community. For more details, contact Mr. J.J. Beagle, Tel: 081-452 0203.

West Midlands Division

At the November 1992 meeting of the Division, Mr. Len Medlycott resigned as Hon Secretary after nine years service. In wishing him well, NSCA Secretary General, Tom Crossett presented him with a gift from the Division as a mark of thanks for all his work for the Division.

John Sweetland was elected Hon. Secretary and can be contacted during the day at Wrekin Council, Tel: 0952 202558.

NSCA POLICY STATEMENTS AND REPLIES TO CONSULTATION DOCUMENTS

January-February 1994

Please contact Sally May at NSCA, 136 North Street, Brighton BN1 1RG, if you would like a copy of any particular document not published in **Clean Air**.

IPR 1/2: Combustion Processes Gas Turbines (Energy Sector). HMIP, 11 January.

Draft IPR Notes – Metal Sector. HMIP, 18 January.

SI 472 – Prescribed Processes and Substances Regulations. DOE, 21 January. (Summary in this issue of *Clean Air*).

Part 2 of NSCA Survey of Local Authority Air Pollution Monitoring 14 February.

Noise & Statutory Nuisance Act 1993 – Draft Advisory Circular, DOE, 18 February.

REPORTS

UV-B AND OZONE LEVELS IN EUROPE AND BRITAIN

Professor Malcolm Fox
Department of Chemistry
The De Montfort University Leicester

As air pollution has changed from a local coal smoke problem through to being global in nature, the need to involve and inform the general population has increased. Large financial investments and some social adjustments are required to give what can be felt to be of little immediate value. Thus, the phasing out of CFCs in favour of alternatives in various areas and the recycling of goods already containing these substances needs to be balanced by demonstrating that these actions are both timely and relevant locally, in Europe and in Britain. There are also preventive health effects which need justification and explanation.

In isolation it is difficult to justify the removal of CFCs in Britain because of the lack of long term UV-B radiation intensity and ozone concentration data. Those actions have to be justified by extrapolating the Antarctic Survey results to the situation in Britain. Measurements require substantial investment in a Dobson spectrometer for the ozone concentration and a specific integrating UV-B monitor, plus the very considerable means to operate them accurately and consistently over a substantial period of years for comparison. This is clearly a responsibility of central governments. With the help of NSCA headquarters, I have been searching for any specific UK information on ozone and UV-B levels. Parliamentary questions have been given bland, delaying answers from which it can be gathered that 'something' is being done.

Looking further afield, I have found some very relevant information in a report from KNMI (The Royal Netherlands Meteorological Institute), KMI (The Royal Meteorological Institute of Belgium) and RIVM (The National Institute of Public Health and Environmental Protection of The Netherlands).(1) The increase in UV-B radiation for February in 1991 through to 1993 shown in Figure 1 is not evidence in itself for ozone depletion because the source intensity, the sun, is known to vary in well defined cycles, some associated with sunspot activity. Variations in atmospheric and stratospheric dust levels can also vary the received levels of radiation across the spectrum due to scattering. But when coupled with the decrease in ozone concentrations, Figures 2 and 3, then the case is made that UV-B radiation levels have increased over Europe due to ozone depletion.

The reported increase in UV-B radiation is relatively small, at about 10%, and was probably masked by the inclement summers of 1991/3. Nevertheless, the UV-B radiation levels/ozone concentration data for the UK needs early publication. People can then first, see the relevance of the CFC replacement programme and second, make their own decisions regarding exposure to sunlight.

Increased leisure has meant more outside activity and exposure to sunlight. The public need to be informed of the changing nature of 'sunlight' and the increased sunburn component. Sunburn is now identified as a major cause of skin cancer. The public in the UK can then make informed choices of their own behaviour, such as reduced sunbathing, higher factor sunscreens or even 'sunblocks'. Parents may decide to reduce children's exposure to sunlight. Participants in summer sports may cover up and protect themselves more. In due course, the Australian practice of 'SLIP' (on a shirt), 'SLAP' (on a hat) and 'SLOP' (on the sunscreen) may become necessary. But we won't know the need for these measures until the analogous UK values for UV-B and ozone are available here as they are for Belgium and the Netherlands.

I gratefully acknowledge permission to reproduce Figures 1-3 from 'Change' and their original sources, The Royal Belgian and Royal Netherlands Meteorological Institutes and The Royal Netherlands National Institute of Public Health and Public Protection, Report, 'Recent Developments in the Ozone Layer and the Ultraviolet Radiation Above Belgium and The Netherlands', published August 1993.

(1)'Thinner Ozone Layer Leads to More UV Radiation', P van Zijst, 'Change', 16, 1, October 1993.

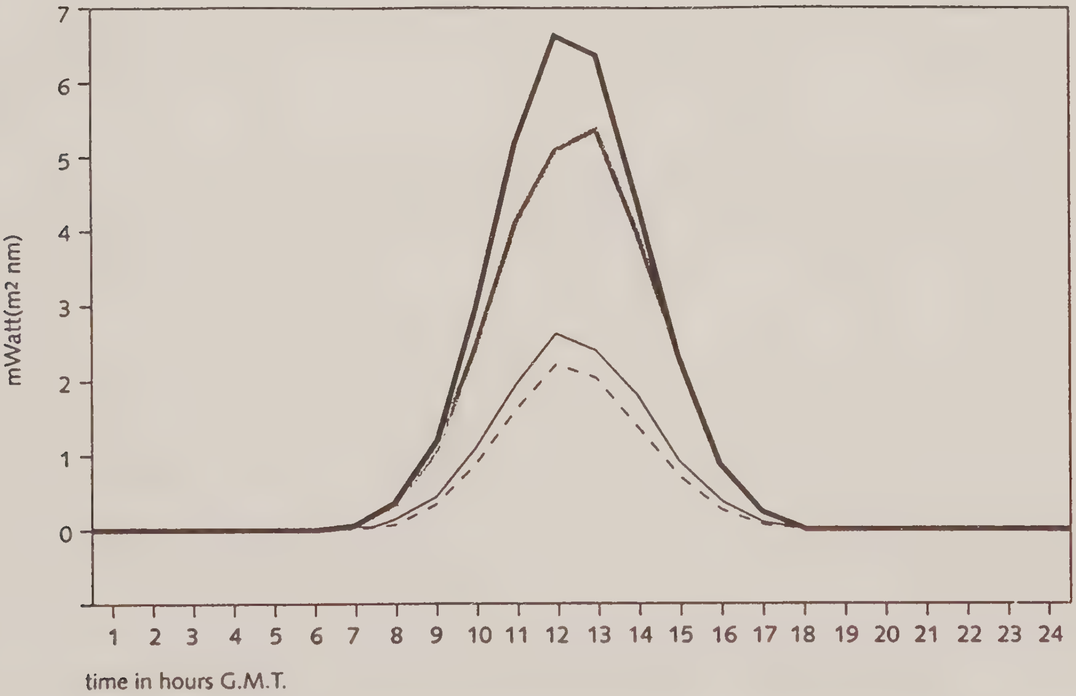


Figure 1: Measurements of UV-B intensity as a function of the hour of the day. From top to bottom: the maximum value for February, 1993; the maximum value for February, 1992; the mean value for February, 1993; and the mean value for February, 1992. (KNMI)

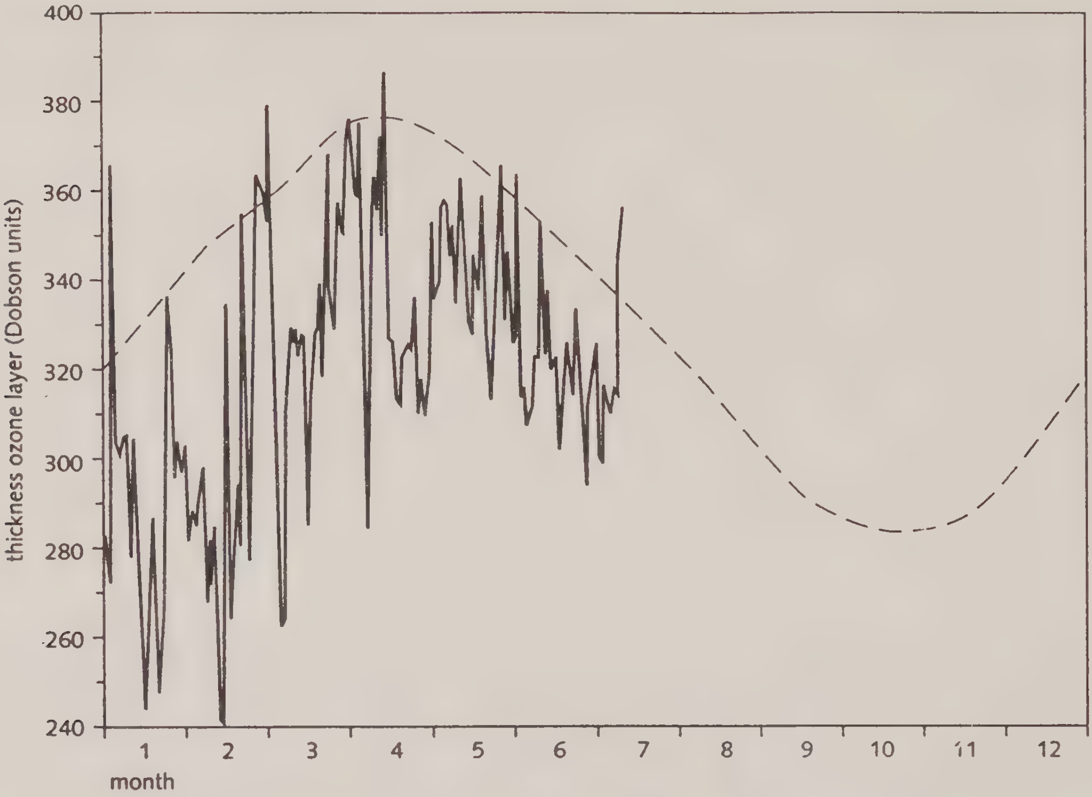


Figure 2: Diurnal mean ozone values for 1993. The dotted line gives the mean values for the period 1971 to 1992. While the diurnal variations are very large, it is clear that the ozone layer in 1993 is thinner than the long-term mean. (KMI)

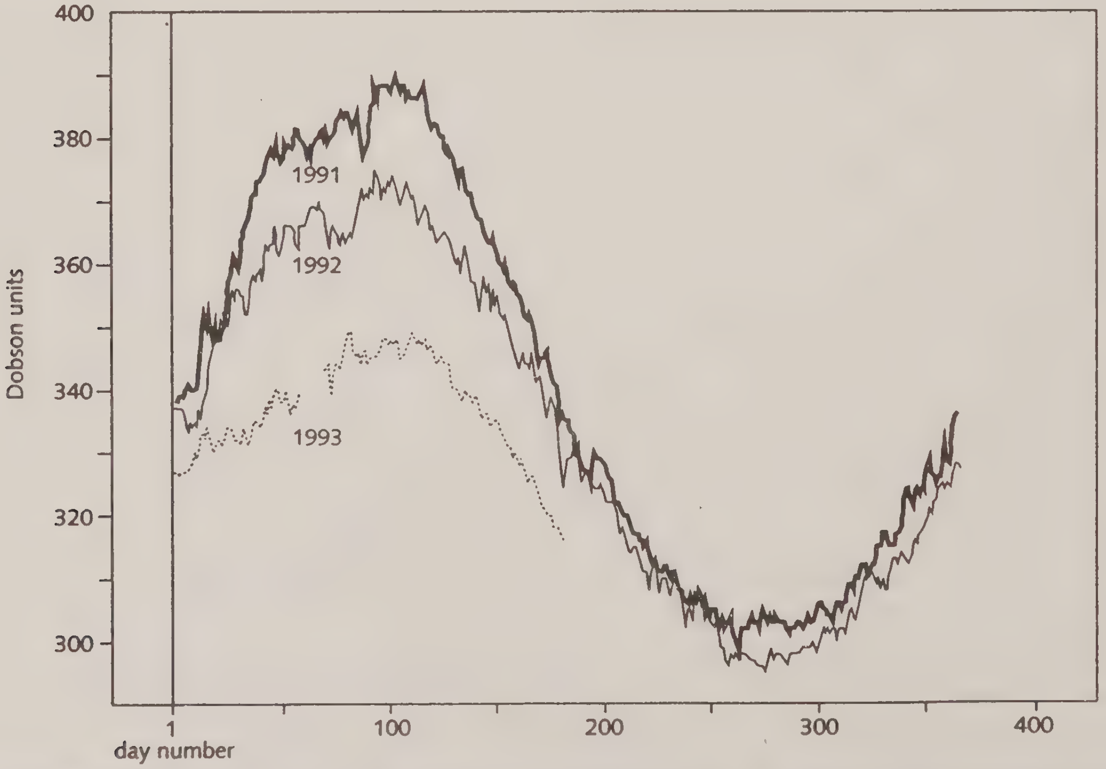


Figure 3: The diurnal value of the mean thickness of the ozone layer above the temperate latitudes of the Northern Hemisphere. From top to bottom are the years 1991, 1992 and 1993. (No data were obtained for a number of days in 1993, hence the break in the line). (KNMI, NOAA)

EXHAUST WATCH
THE WESTMINSTER INITIATIVE WAY

Chris Cawley
Principal Environmental Health Officer (Pollution Control)
Westminster City Council

Air Quality in Central London

Air pollution from the traditional pollutants (smoke and sulphur dioxide) produced from burning fossil fuels has dramatically reduced in London and other major cities over the past 40 years. This is mainly due to the development of smoke control areas under the *Clean Air Acts* following the lethal smogs of the 1950s.

The major source of air pollution in Westminster is now from motor vehicles. The key pollutants being nitrogen oxides, carbon monoxide, and hydrocarbons. Ozone is a secondary pollutant formed through photochemical effects on warm summer days. The level of pollution from this source in Central London is increasing. Indeed diesel engined vehicles now account for over 80% of the smoke produced in urban areas.

The levels of airborne lead — from motor fuel — have reduced significantly over recent years. This results from the reduction in lead content of petrol in 1986 and the increasing use of unleaded fuel.

Public concern over air quality, especially vehicle related pollution, is increasing. The number of complaints received by the Environmental Health Division about air quality generally and about specific pollution problems has increased dramatically over the past year.

There are significant periods when the air quality in Central London exceeds Department of the Environment (DoE) guidelines and World Health Organisation (WHO) standards.

Tackling Vehicle Pollution in Urban Areas

Long Term Actions

These actions involve a very long timescale and extensive capital investment but are essential if urban vehicle pollution is to be resolved rather than merely kept in check. They are matters for Central Government in partnership with the private sector. Local authorities have a role to play but it needs to be clearly defined.

They involve major capital projects such as:
- improved integrated public transport facilities;
- better designed, more efficient vehicles operating on alternative fuels;
- road pricing schemes.

Short Term Actions

These are actions which local authorities and the public can take to significantly improve local pollution problems – at least in the short term.

- proper local and through traffic routing. To keep non essential vehicles from using residential areas whilst keeping through traffic on the move;
- encouraging the public and businesses to make better use of transport including public transport, cycles and walking;
- dealing with pollution from individual vehicles.

Westminster's Exhaust Watch Scheme

The Scheme was launched in December 1992 as a pragmatic approach to tackling the problems of pollution from individual vehicles. It has three key aims directed at vehicle owners and operators:

1. To encourage them to convert their vehicle to run on unleaded petrol and other alternative fuels where possible
2. To have their vehicles regularly serviced and maintained as well as possible to minimise pollution
3. To switch off their engines whilst stationary for significant periods especially whilst loading or unloading.

The Scheme has expanded and developed over the year, as a result of experience gained and in the light of responses from the public. It is currently operating in three phases:

1. The Spotter Campaign

This was the first phase of the scheme and followed the Recommendations of the Royal Commission on Environmental Pollution (15th Report – September 1991) and work done by Derby and by Kirklees Borough Councils.

Members of the public who see vehicles with smoky exhausts are encouraged to report the matter to the EH Division using a pre-paid report card or telephone hotline (071-798 1212).

The Division then notify the relevant enforcing authority for action:

- Large commercial vehicles – the DoT Vehicle Inspectorate;
- Taxis – the Metropolitan Police Public Carriage Office;

For private cars and vans we obtain the details of 'ownership' from DVLC at Swansea and then send a standard letter and guidance literature to the registered keeper.

A summary of the reports received for the year are given in figures 1 and 2.

Clearly from the public perspective taxis are the category of vehicle giving most concern. The seasonal increase in reports during summer months is interesting. This could reflect greater pollution problems in warmer weather or increased outdoor activity by the public in summer bringing them closer to the pollution.

2. Roadside Vehicle Exhaust Checks

Since April 1993, the Council's Pollution Control Officers in conjunction with the Metropolitan Police (Traffic Division) and the Department of Transport Vehicle Inspectorate have been carrying out a programme of roadside checks on vehicles in Westminster.

We have established six sites across the City which are used in rotation. On the test days (1 or 2 per month at present) vehicles are stopped at random by the police. Checks on the exhaust emissions are undertaken at the roadside with the vehicle stationary and the engine left on tick over.

Council officers undertake the checks on petrol vehicles using a mains-powered Horiba exhaust gas analyser. This is the same as the annual MoT test and measures carbon monoxide and hydrocarbons. The current test limits are:

- Before P registration (August 1985): no excessive visible emissions
- P to Y registration: 6.0% Carbon monoxide; 1200 ppm hydrocarbons
- A registration onwards: 4.5% Carbon monoxide; 1200 ppm hydrocarbons.

The Vehicle Inspectorate have worked with us and been in attendance on a number of test days in 1993. They have checked large diesel engined vehicles using a portable smoke analyser. This test measures smoke density (expressed as a K factor) when the engine is revved to full throttle four times (or ten times in borderline cases). Current test levels prescribe an emission level of K=1.8 to pass the test. The test requires a warm engine to be successful and therefore the vehicle must have been operating for a few miles or the test is void. Smaller diesel engined vehicles (for which there has not been a prescribed analytical test) have been assessed visually by experienced vehicle examiners. A new test similar to that for larger diesels commenced in February 1994.

The drivers are given a report on the test and advice on air pollution and vehicle emissions. Where diesel vehicles are found to be emitting excessive pollution the Vehicle Inspectorate have been undertaking enforcement action – normally the service of a notice. Whilst the vehicle is being tested, the police have also undertaken road safety checks on them.

The cooperation of the drivers has been very good. The test procedure only takes a few minutes and is virtually painless. Unless of course they are detained by the police for other matters. Figures 3, 4 and 5 give a summary of the results of checks in 1993.

Together with the Transport Research Laboratory we have undertaken a field based evaluation test for an automated system of measuring exhaust emissions on moving vehicles. This apparatus was developed by Professor Stedman of the University of Denver. This equipment measures the exhaust emissions from moving vehicles and is a useful screening tool to identify grossly polluting vehicles. However since UK legal test standards are based on stationary vehicles with idling engines there is little scope for using the apparatus for enforcement purposes at present.

3. Tackling Stationary Vehicles

Exhaust emissions from stationary vehicles are significant and a totally unnecessarry addition to the pollution problem. A substantial number of the Exhaust Watch report cards received at the start of the scheme were complaining about this problem. Throughout the summer public complaints continued to flood in. The Council consider this to be a significant issue and have attempted to approach the matter from several sides.

Letters were sent out by the Environmental Health Division to the major vehicle fleet operators in May 1993 (during National Environment Week) requesting their cooperation in ensuring their drivers switch off their engine when stationary for significant periods especially whilst loading or unloading. Further awareness publicity has been issued since including an article in the Council's quarterly newsletter to all food premises in the city.

Where officers observe stationary vehicles with engines running they will approach the driver and request cooperation. Where specific complaints are received from members of the public about stationary vehicles then the division will try to track down the owner or operator and send a letter advising of the air pollution problems and requesting their cooperation.

Future Proposals

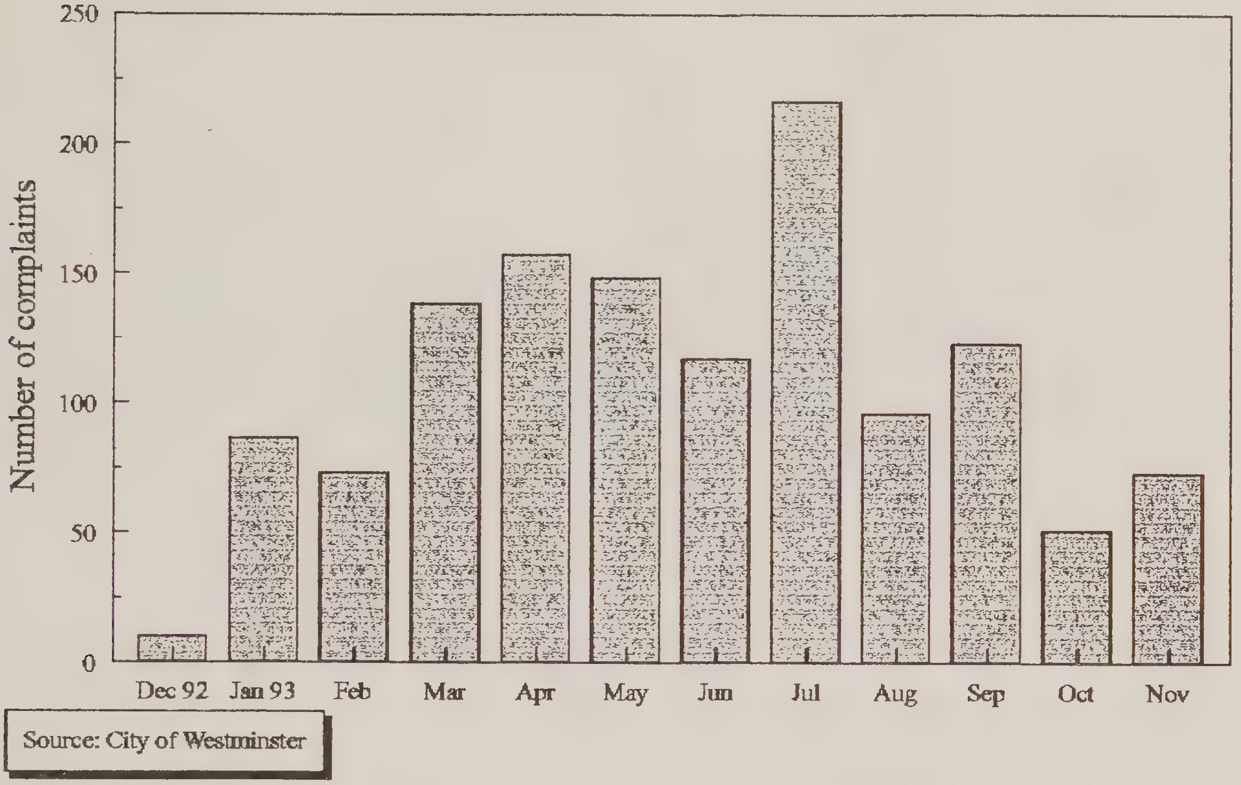
Since the launch of the Scheme, the Council have developed close working arrangements with various other bodies to pool ideas and resources to mutual benefit. We have learnt a lot from them, and achieved success in raising the profile of the vehicle pollution problem with drivers themselves as well as at local and national level. The City Council will be continuing with the Scheme throughout 1994, and increasing the frequency of roadside checks.

In addition we are looking at a fourth phase. Extending the partnership approach, which is a hallmark of the Westminster Initiative, we are proposing to introduce a Considerate Fleet Owners "club". Operators of vehicle fleets in the City including the Council's own contractors will be encouraged to meet a number of green criteria and to maintain high standards. Routine exhaust emission testing of the Council's own vehicle fleet and those of its principal contractors is already well advanced.

The City Council are also actively looking into the possible uses of alternative vehicle fuels. A year's trial using "Greenergy" city diesel on four vehicles commences in April 1994. Another trial using compressed natural gas is also being considered on petrol engined vehicles.

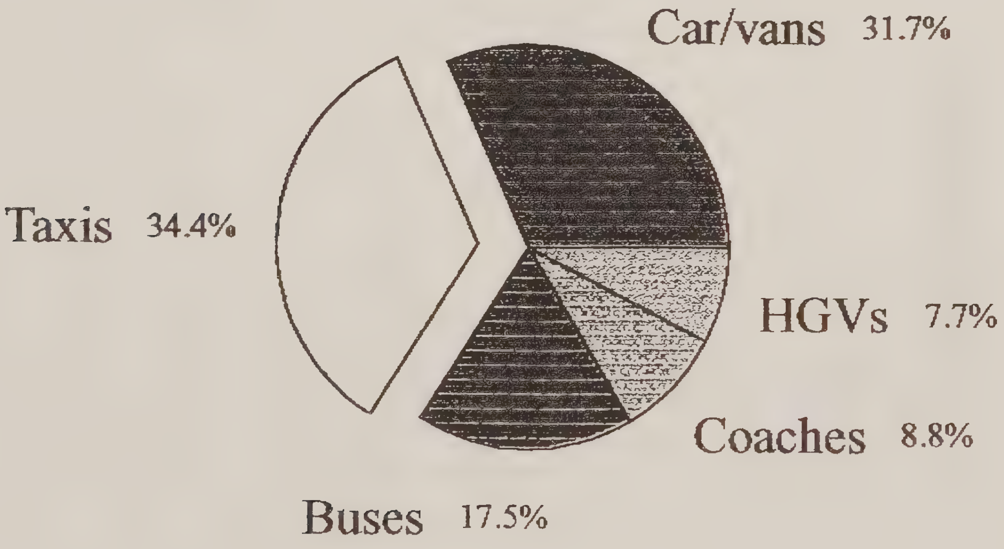
Unfortunately, the recent reorganisation of the Vehicle Inspectorate has significant resource implications for the roadside testing of diesel engined vehicles on a regular basis in any given locality. They have their own targets and priorities, area wide, which are unlikely to be the same as ours or indeed those of any particular Borough. We welcome their continued cooperation and assistance at whatever level they can resource.

The City Council is concerned about the inadequate powers available to local authorities to tackle pollution from individual vehicles. During 1994 the Council will be actively lobbying Parliament for such additional powers.



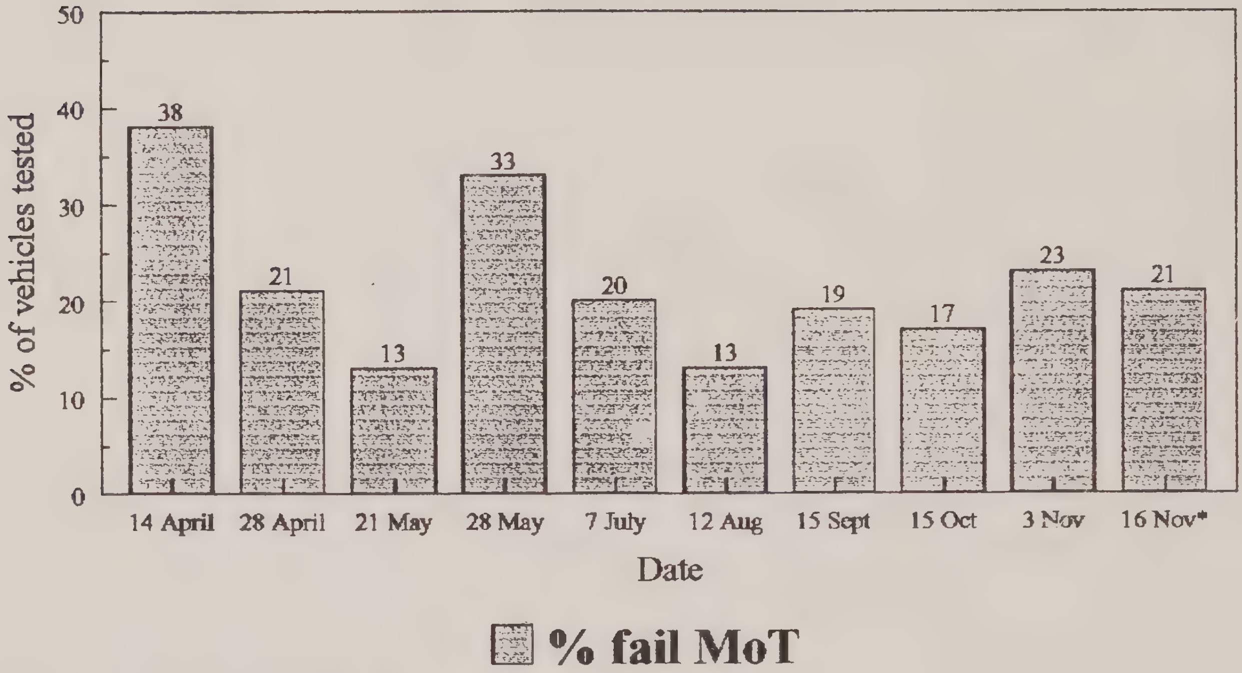
Source: City of Westminster

Figure 1: Exhaust Watch – spotter campaign: Total complaints by month.



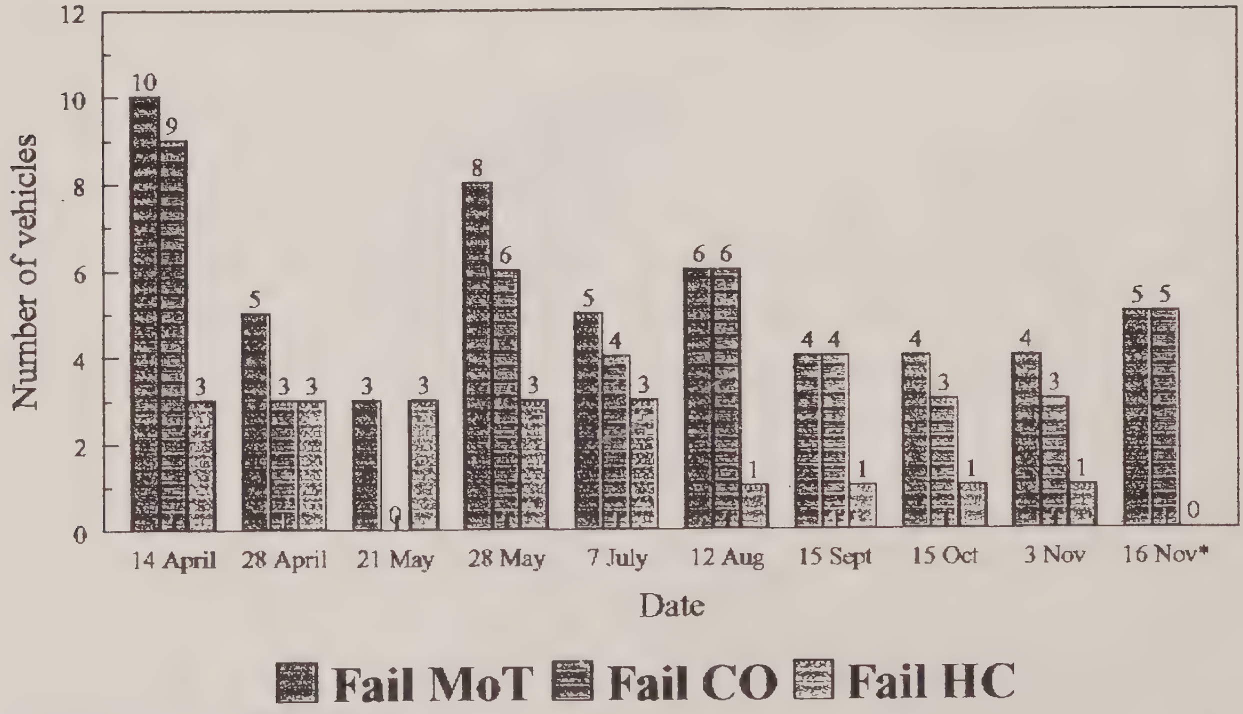
Source: City of Westminster

Figure 2: Exhaust Watch – spotter campaign: Total complaints by vehicle type.



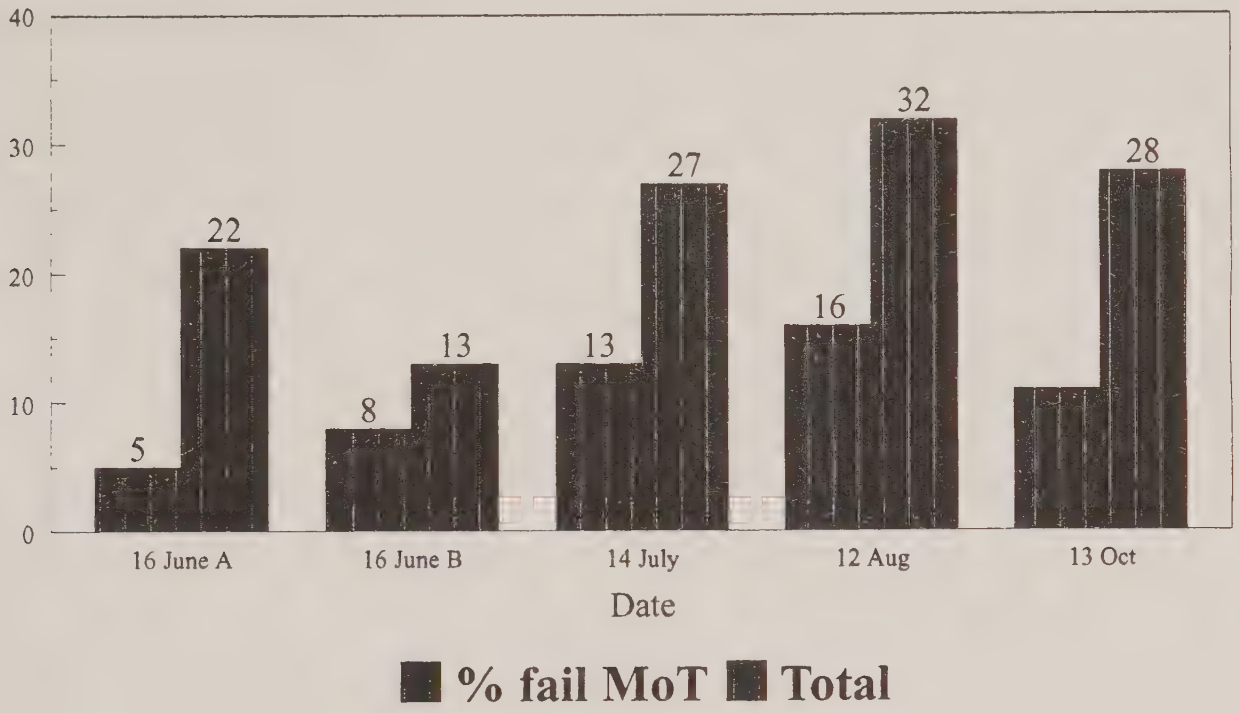
Source: Westminster City Council
* using Stedman apparatus

Figure 3: Exhaust Watch – roadside checks: Petrol – failure rate.



Source: Westminster City Council

Figure 4: Exhaust Watch – roadside checks: Petrol – reasons for failure.



Source: Westminster City Council

Figure 5: Exhaust Watch – roadside checks: Diesel – failure rate.

THE CHALLENGE OF THE EC's FIFTH ENVIRONMENTAL ACTION PLAN

Adrian J. Wilkes
Managing Director
Environmental Policy Consultants

Brussels has made a powerful start to implementing the new EC Fifth Environmental Action Programme (1993-2000), confronting British industry with a substantial commercial challenge. A Progress Report, *Anticipating EC Environmental Policy,* reveals that in 1993 some 34 EC environmental laws were adopted and 30 formal proposals are under political consideration. There are also a further 23 draft laws in the Brussels "policy pipeline".

As EC Environment Commissioner, Yannis Paleokrassas, recently stated "in 1993 there was a quiet revolution signifying a radical change of attitude. . .The most striking feature [of 1993] is undoubtedly the preparation of a long-term strategy to reconcile environment, growth and jobs".

A revolution in EC environmental policy-making is indeed now underway as Brussels begins implementing the EC's Fifth Environmental Action Programme, "Towards Sustainability". Between 1993 and 2000 Brussels will be tightening and extending environmental laws to ensure that the Single Market is a "Green Market".

The implementaion of these EC environmental laws will have major impacts upon British business. There will be very substantial cost implications, undoubtedly running into billions. Some £340 million, for example, will have to be spent over the period 1995-2004 to meet the proposed controls on VOC emissions from petrol distribution. Conversely, there will also be significant new market opportunities. The market for industrial air and gas cleaning equipment, for example, currently valued at $4.57 billion will peak in 1994-95 at $6 billion, as utilities, chemical companies and waste incinerators act on EC legislation.

1993 saw an array of new environmental legislation adopted that will affect mainstream British business. This included, *inter alia*:

- the SAVE (Specific Actions for Vigorous Energy Efficiency) Programme;
- a monitoring mechanism for greenhouse gas emissions, that is likely to lead later to tougher controls on industrial emissions;
- the (voluntary) environmental management and auditing scheme, with its requirement for inventories of environmental releases and effects and public reporting;
- extension of the Community's programme to protect forests from air pollution to cover analysis of soil deterioration;
- reductions in the sulphur content of heating, industrial and bunker gasoils, and diesel fuel;
- the first phase of emission reductions to bring light commercial vehicles in line with car emission standards;
- new test procedures for motor vehicles so that CO_2 emissions and fuel consumption are calculated;
- a system for monitoring vessels carrying any dangerous freight.

The Community also ratified the UN Framework Convention on Climate Change. And as a sign of renewed vigour, the December 1993 Environment Council, when adopting the Decision, called on the Commission to prepare "a plan that will ensure" that the Community and Member States stabilise carbon dioxide emssions by 2000.

Proposals in the pipeline include, for example, the integrated pollution prevention and control regime, reinforcing Britain's IPC controls; energy efficiency standards for refrigerators; new controls on the transport of dangerous substances by road and by sea; noise limits for earth-moving equipment; tighter procedures for environmental impact assessment (and its extension to regional and national policies); and a whole array of new controls on air pollution, including:

- controls on VOC emissions from petrol distribution;
- new car emission standards;
- tighter limits on combustion plants' emissions;

- new phase-out deadlines for CFCs (and substitutes);
- controls on PBBE flame retardants; creosote, chlorinated solvents, nickel and flammable aerosols.

The EC's Environment Commissioner wasn't guilty of hyperbole when he said that "in 1993 there was a quiet revolution. . .very thorough work has been carried out". And the Fifth Envrionmental Action Programme has more in store, for example:

- amendments to the existing legislation on SO_2, NO_2, lead, particulates and black smoke;
- reduction targets for methane and nitrous oxide emissions;
- product standards (re SOx and NOx) for coal, fuel oils and residuals;
- reductions in VOC emissions from the transport sector, industry solvents and paints, and the chemical industry;
- air quality monitoring and controls for WHO air quality values;
- standards for ammonia emissions from new farm buildings;
- further reductions of noise emissions (from cars, trucks, aircraft, cranes, mowers, etc).
- fiscal incentives for alternative fuels and cleaner fuels;
- road pricing;
- an integrated environmental/consumer safety label;
- formal environmentally-evaluated GNP tables;
- regional, national and community statistics on the environment.

However, the need for action is dramatic. The Commission's 1992 "State of the Environment Report" revealed that the data available shows that adverse trends observed in the past have not been reversed. It identifies numerous "disturbing trends". For example there has been a 13% increase in waste over the last 5 years (despite recycling). EC energy consumption will increase by 25% by 2010 at current rates, leading to a 20% increase in EC carbon dioxide emissions.

To meet these environmental challenges, the Fifth Programme sets out the key points of the new strategy, mapping out the broad lines of action for the next decade, setting quantified targets and stating the policy measures to attain them. It contains dozens of different new policy initiatives for the rest of the decade.

And instead of just relying, as in the past, on setting regulatory standards, a new range of policy instruments will be developed to highlight our shared responsibility. Consumers will have better information about products and companies' environmental performance. Scientific knowledge about environmental problems will be improved. Environmental education and training will be developed. Most notably, green taxes will be used to ensure that the price of goods and services reflects environmental costs, and so change behaviour and consumption patterns.

Five economic sectors, industry, energy, transport, agriculture and tourism, are specifically targeted with a package of measures, which include standards for manufacturing processes and products; air quality controls; and tighter risk management procedures. Behind this strategy is the ultimate aim of transforming future economic growth onto a sustainable development path — growth is still the aim, but it must preserve the quality of our environment and not deplete natural resources.

British companies have no option but to anticipate future EC environmental policy to ensure their companies' future survival.

*Anticipating EC Environmental Policy, A Report on the Policy Plans of the ECs Fifth Environmental Action Plan (£25); and EC Environmental Policy Monitors, A quarterly Report on EC Environmental Policy Developments (£195 a year) are available from Environmental Policy Consultants, 6 Donaldson Road, London NW6 6NB (Tel: 071-372 7122).

UPDATE

THE UK AND MEETING ITS RIO COMMITMENTS

On 25 January the UK Government launched four major publications outlining its strategies for meeting its commitments under the various Conventions which were signed in Rio de Janeiro at the Earth Summit in 1992, and to which it has now agreed. All the publications outline the measures currently in hand and identify further actions through which it is intended to meet the obligations of the Conventions.

Sustainable Development: the UK Strategy sets out by environmental resource and by economic sector, the current position and projections of where the UK will be in 20 years time based on current policies. It looks at the principles of sustainable development, and at the processes the UK has, or which could be developed for meeting these principles.

To encourage discussion and progress on sustainable development and the UK's strategy, three new fora are proposed: the Prime Minister is to appoint a Panel on Sustainable Development consisting of environmental, scientific and business experts to advise on future developments; the Environment Secretary is to set up a UK Round Table on Sustainable Development which will bring together representatives of the main sectors and groups to discuss sustainable development issues with government ministers; finally, the Citizens Environment Initiative will encourage the growth of interest in sustainable development in consultation with voluntary bodies, local authorities and other community groups.

Biodiversity: The UK Action Plan outlines programmes and targets for the conservation of wildlife and habitats. A steering group drawn from a wide range of interests will oversee the targets.

Sustainable Forestry: The UK Programme outlines government policy and objectives, based on a 1991 forestry policy statement. A review of forestry policy is expected to be completed in 1995 and will form the basis for future policy.

Climate Change: the UK Programme sets out the Government's programme for returning its emissions of the three main greenhouse gases (carbon dioxide, methane and nitrous oxide) to 1990 levels by 2000. The Programme also looks beyond 2000 and sets out some of the longer term options for action that may need to be considered in the light of emerging scientific evidence.

Carbon Dioxide

Total UK manmade emissions of CO_2 are estimated at 158 Mtc for 1990 and under a "central growth/low fuel price scenario", emissions for 2000 are projected to be about 10 Mtc higher. Thus the UK's programme involves savings of 10 Mtc from various sectors. These are shown in Figure 1.

Methane

Total UK manmade emissions of methane in 1990 are estimated at about 5 million tonnes, of which the main sources are landfill (39%), agriculture (32%), coal mining (16%) and gas distribution (8%). As estimates of future methane emissions are subject to uncertainty, the Government has worked on the basis of a 5% increase by the year 2000 and has thus drawn up a pro-

Sector*	**Expected reduction in emissions by 2000, MtC**
Energy consumption in the home	4
— introduction of VAT on domestic fuel use	
— new Energy Saving Trust	
— energy efficiency advice / information including Helping The Earth Begins At Home publicity	
— eco-labelling	
— EC SAVE programme (standards for household appliances)	
— revision of Building Regulations to strengthen energy efficiency requirements	
Energy consumption by business	2.5
— energy efficiency advice / information Making A Corporate Commitment Campaign Best Practice Programme Regional Energy Efficiency Offices Energy Management Assistance Scheme	
— Energy Saving Trust schemes for small businesses	
— Energy Design Advice Scheme	
— possible EC SAVE programme (standards for office machinery)	
— revision of Building Regulations to strengthen energy efficiency requirements	
Energy consumption in the public sector	1
— targets for central and local government and public sector bodies	
Transport	2.5
— increases in road fuel duties and commitment to real increases of at least 5% on average in future Budgets	
TOTAL	10

Note *Savings in the electricity generating sector have been allocated to final users (including encouragement of renewables and CHP).
This table is intended as a summary of the key measures. Allowance has been made for overlap between some of the individual programmes. *Source: DOE*

Figure 1: Summary of CO_2 Savings

gramme designed to reduce emissions by 0.6 Mt by the year 2000. This would in fact result in total emissions of 4.4 Mt, below the 1990 target. DOE estimates changes in emissions by sector, as shown in Figure 2.

Nitrous Oxide

Total UK manmade emissions of nitrous oxide in 1990 are estimated at 0.11 Mt; 73 per cent of this comes from industry, in particular the manufacture of nylon, and 17 per cent from agriculture; vehicles and fuel combustion account for the remainder. Control measures to be adopted by government and industry are expected to result in a drop in emissions to around 0.03 Mt annually in 2000.

Executive summaries of the four reports are available from the Department of the Environment, PO Box 151, London E15 2HF.

Source	Change in emissions 1990 to 2000 (Mt)
Landfill	−0.16
Agriculture	−0.1
Coal mining	−0.4
Gas distribution	−0.05
Oil and gas	+0.03
Sewage	+0.03
End use and petrochemicals	+0.01
TOTAL	−0.6

Note: Figures may not add up exactly due to rounding errors. There are considerable uncertainties in many of these estimates *Source: DOE*

Figure 2: Anticipated Changes in Methane Emissions From 1990 to 2000 by Source.

NATIONAL INVENTORIES OF GREENHOUSE GAS EMISSIONS

Under the UN framework Convention on Climate Change which came into force on 21 March 1994, participating countries will be required to submit national inventories of greenhouse gas emissions on a regular basis in order to demonstrate the effectiveness of their greenhouse gas control strategies.

To aid this process the Intergovernmental Panel on Climate Change (IPCC) has developed guidelines for calculating and reporting greenhouse gas emissions incorporating a methodology which is applicable to a variety of circumstances. During its work, the IPCC has drawn on the expertise of the OECD and IEA. The draft guidelines have been tested in a wide range of countries and regional workshops, funded by individual countries and UNEP.

The guidelines are now to be edited by a UK based information development consultancy, TMS Computer Authors of Surrey, who have considerable experience of preparing documentation for multi-cultural and multilingual audiences.

The IPCC guidelines will consist of three volumes (Reporting Instructions, a Workbook, and a Reference Manual) allowing countries to take a flexible approach. They can use the IPCC calculation methods contained in the Workbook and Reference Manual or substitute their own methods if these meet local needs better. By submitting all results and supporting information according to the requirements of the Reporting Instructions, however, the greenhouse gas emission figures submitted by any country will conform to an internationally agreed standard.

DEREGULATION BILL

The Deregulation and Contracting Out Bill was published in January. It has now had its first and second readings in the House of Commons and went to Committee on 15 February.

Chapter I of the Bill provides Ministers with powers to amend or repeal legislation by Order "for the purpose of removing or reducing burdens on business or others". Before doing so the Minister would be required to consult representatives of affected interests and then to lay a draft Order before Parliament; this would have to be accompanied by an explanatory document giving reasons for the proposal, benefits, how any protection (of, eg consumer safety) was to be maintained, etc and details of the public consultation. Draft Orders would be subject to debate in both Houses of Parliament, followed by a forty day period to allow for further scrutiny, perhaps by committee, before a final draft of the Order was laid for debate.

Chapter II of the Bill lists a number of specific amendments or repeals of legislation. This includes, Clause 20, amendment of Section 34 (duty of care) of the *Environmental Protection Act 1990.* This will clarify the position regarding documentation for repeated transfers of waste; once adopted this will enable such transfers to be covered by a single set of documentation (so long as the waste to be transferred is the same in each case), renewable periodically.

Clean Air Act 1993

Deregulation — cutting the red tape, published by the Department of Trade and Industry, is a bulky set of documents outlining the reasoning behind the deregulation drive and it includes a further list of regulatory measures to be considered for repeal or amendment by the Order procedure. Included in the list is the repeal of sections 4-13 of the *Clean Air Act 1993.* These relate to the approval of smoke control equipment for new furnaces; fitting of approved plant to arrest emissions of grit and dust, limits on emissions and measurement of such emissions.

It is suggested that these sections are no longer needed as larger furnaces would be covered by Part I of the EPA and smaller ones by nuisance legislation — a view which drew an almost universally critical response from NSCA members (see *Clean Air,* Autumn 1993). The Department of the Environment had also sought views on the repeal of the chimney height provisions of the Act (sections 14-16); this proposal, however, appears to have been dropped as it is not included in the DTI's list.

FUEL REGULATIONS

In answer to a recent PQ from Chris Smith MP, the Environment Minister said that the need for Regulations:

(a) banning the sale of unauthorised fuels in smoke control areas and
(b) limiting the sulphur content of domestic fuel

is being reconsidered. The Minister said that since proposals for the two sets of regulations were presented (in 1990 and 1992, respectively) levels of smoke and sulphur dioxide had continued to decline and were on average five per cent lower than in 1991-92.

EPA REGULATIONS

Implementation of amended *Prescribed Processes and Substances Regulations* which had been expected on 1 April 1994, has now been delayed. This is to enable "full and proper consideration" to be given to the more than 200 responses received to the second round of consultation (see NSCA views, this issue of *Clean Air*).

No new date has yet been given for implementing the amending regulations.

PART B PROCESS CHARGES

Revised local authority charges for dealing with Part B processes under Part I of the *Environmental Protection Act 1990* took effect on 1 April. The revised charges which apply for the year 1994/95 are as follows:

- application fee: £965
- substantial change fee: £620
- annual subsistence charge: £585

Charges for waste oil burners below 0.4 MW are unchanged at £100, £65 and £100, respectively.

WASTE MANAGEMENT REGULATIONS

The Government has announced its intention to bring the new waste management regulations into force on 1 May 1994.

Under the new regulations which were originally intended to come into force on 1 April 1993 applicants for and holders of licences will be subject to a test of whether they are "fit and proper persons". This test includes examination of any convictions for a list of prescribed environmental offences; of the technical competence of the manager of the licensed activities; and of the financial ability of the licensee to meet the requirments of the licence, both in normal conditions and in case anything goes wrong and corrective action is required. Prescribed offences, and technical qualifications, will appear in the regulations; guidance will be given on assessment of fit and proper persons in a revised Waste Management Paper No. 4.

A scheme of fees and charges in respect of waste licences will be introduced to cover the costs of authorities' consideration of applications for new licences, and for the modifications, transfer and surrender of current ones, and subsistence charges to cover the Government's assessment of the reasonable costs of supervision. Enforcement costs, such as prosecutions, are not covered by the scheme.

Under the new system, the licence may only be surrendered when the regulation authority accepts it, which they will only do when they are satisfied no further pollution from hazardous gases or leachate is likely.

LOCAL ENVIRONMENT CHARTER

The Department of Environment has published a model charter — *Your Council and the Environment* — which recommends standards for environmental services provided by local councils. It deals with those services of most concern to the public such as air pollution control, litter, noise, smoke and odour, waste collection and regulation and dog nusisance. It summarises what the public can expect from the council in each area and outlines what individuals can do to help their council protect the environment.

Copies of the Charter will be available in public libraries and Citizens' Advice Bureaux. Copies are also available from Angela Talboys, Room A127, Romney House, 43 Marsham Street, London SW1P 3PY. Tel: 071-276 8393.

BENZENE AQS

The first report* of the Government's independent Expert Panel on Air Quality Standards has recommended an AQS of 5 ppb as a running annual average for benzene in the UK. In assessing available health and air quality data on benzene, the Panel also recommend that the Government should set a target for reducing the running annual average to 1 ppb. These recommendations are intended to reduce the level of exposure of the population to benzene such that ambient air pollution is no longer the main source of individual exposure, even for non-smokers.

Benzene is an organic chemical which is known to cause cancer in humans – the WHO in its 1987 *Air Quality Guidelines for Europe* consider that no safe level for airborne benzene can be recommended and that there is no known safe threshold. In the UK the main source of atmospheric benzene is petrol vehicle exhaust (78% in 1991).

Following publication of the report, the Environment Minister announced that daily information on benzene levels is to be made publicly available. Benzene will be one of the pollutants monitored by the recently established Enhanced Urban Monitoring Network and will be included on the information bulletins available via CEEFAX, TELETEXT and Freephone.

The report is the first in a series which will make recommendations for other pollutants suggested to the Panel by the Government. Recommendations on ozone, carbon monoxide, 1, 3 butadiene, nitrogen dioxide, sulphur dioxide and particulates are expected in the future.

***Benzene*, Expert Panel on Air Quality Standards, 1994. Available from HMSO, £5.95.

DIESEL VEHICLE EMISSIONS

The second report† from the Quality of Urban Air Review Group (QUARG) was published in January. It reviews the available data on the relative contributions to urban air pollution from diesel and petrol vehicles and examines the likely future consequences of an increased market penetration of diesel cars.

The report highlights the level of emissions of fine particulate matter from diesel vehicles, largely because of possible effects on health. This finding will be further considered in the light of advice from the Department of Health's Committee on the Medical Effects of Air Pollutants, which is expected to report on possible health effects of particulates in late 1994. In the meantime the Environment Minister has asked the Committee for interim advice on possible health effects.

The report concludes that:

- assuming no major advance in emissions control technology for either petrol or diesel engine cars, an increased market penetration, compared with current levels of diesel cars at the expense of three way catalyst petrol cars will on balance have a deleterious effect on urban air quality.

- road vehicles account for 74% of nitrogen oxides and 94% of black smoke emissions in London. On their own, diesels account for 32% and 87% of total emissions (43% and 92% of vehicle emissions) for these two pollutants respectively.
- the major proportion of diesel emissions in London comes from goods vehicles.
- if near equivalent diesel and catalyst equipped petrol cars are compared, the diesel is superior in relation to carbon monoxide and hydrocarbons and the three greenhouse gases, carbon dioxide, methane and nitrous oxide, but has larger emissions of nitrogen oxides (by a factor of about two) and far larger emissions of particulate matter and black smoke.
- if the proportion of sales of diesel cars were to be steady at 16%, road transport particulate matter emissions will have approximately halved from their present level by 2005. However should market penetration increase to 50% of the car fleet, emissions of particulate matter from road transport would be almost unchanged from their present value.
- Recent analysis of urban nitrogen dioxide pollution episodes indicate that emissions from low level oxides of nitrogen sources will need to be cut by approximately half to eliminate the occurrence of episodes. The time period over which this can be achieved will be extended if there is a substantial increase in market penetration of diesel cars.

NSCA comment: see under NSCA Views, this edition of *Clean Air.*

†Diesel Vehicle Emissions and Urban Air Quality, the second report from the Review Group is available free of charge from the QUARG Secretariat, Institute of Public and Environmental Health, University of Birmingham, Edgbaston, Birmingham B15 2TT.

LOW FREQUENCY NOISE

At a meeting last year of the Department of the Environment's Noise Forum, NSCA suggested a need for further research into limiting low frequency noise emissions from vehicles, in particular HGVs. The DOE have now brought us up-to-date on recent research in this area carried out by the Department of Transport.

"HGV noise has been the subject of much Government research over the past 10 years, or so. The first of these was the QHV 90 project which investigated engineering solutions to, the then, forthcoming EC noise limits. This was followed by another project at the Transport Research Laboratory which looked into perceived noise nuisance from HGVs where vehicles were driven past a 'jury' of observers who were located adjacent to the test track and in a listening room under simulated household conditions. In addition to these projects, another study has looked at the vibration effects of road vehicles at 50 sites throughout the UK.

"The results of these projects have demonstrated that the dB(A) scale is a fairly accurate reflection of the human perception of vehicle noise and no evidence can be found to suggest that moving to the 'C' weighting, which takes greater account of low frequency noise than the 'A' weighting, will improve either noise or vibration nuisance in houses. Nonetheless, the Department of Transport is committed to reducing the environmental impact of all road vehicles and will take views into account when reviewing its research into vehicle noise related matters.

"The two reports mentioned above are *'An examination of the relationship between vehicle noise measures and perceived noisiness'* by G.R. Watts and P.M. Nelson (research report 318), and *'Noise nuisance from road traffic vibration, results of the 50 site survey'* by G.R. Watts (LR 1119). Both are available from the Transport Research Laboratory".

NOISY NEIGHBOURS

Over 50% of homes are exposed to daytime noise levels which exceed World Health Organisation recommendations, rising to 63% at night, according to BRE research on the noise climate around homes and its effects on occupants.

Findings from BRE's Information Paper IP 21/93 'The noise climate around our homes' published in January are based on noise levels recorded for 24 hours outside 1000 individual homes in England and Wales over a one-year survey period. It concludes that 56% of dwellings are exposed to a noise level in excess of 55dB(A) which is the level recommended by the WHO to prevent significant community annoyance. The study also showed that traffic noise was noticeable outside 90% of properties, although only 5% faced main roads, and 7% of homes were above the qualifying level for sound insulation for new roads.

The Paper includes information on the types of noise affecting homes, the percentage of people exposed to different levels, and hourly and geographical patterns. The national survey will be repeated every five years to provide data on long-term trends in the noise climate, as well as indicating the success of further reductions in road vehicle noise limits planned for 1996.

Road traffic noise is heard by the greatest number of people in their homes, but noisy neighbours, once heard, give rise to the biggest proportion of objections, according to the BRE noise attitude survey of over 2000 households. IP 22/93, 'Effects of environmental noise on people at home, identifies common sources of environmental noise and typical human reactions, which are partly determined by factors such as age, sex, lifestyle and personality.

The Paper also shows the proportion of people who 'heard' and 'objected to' specific neighbourhood disturbances, and the physical and emotional impact of the main types of noise. BRE's preliminary research identified that many people had difficulty in answering questions used in previous noise attitude surveys, and BRE's questionnaire was designed to more accurately reflect their responses.

Copies of IP 21/93 'The noise climate around our homes' and IP 22/93 'Effects of environmental noise on people at home' are available from the BRE Bookshop, Building Research Establishment, Garston, Watford WD2 7JR, Telephone: (0923) 664444, price £3.50 (plus 35p p&p) each.

NOTE ON NOISE FROM WATER SKI VESSELS AND SKI MOBILES

The Winter 1993 issue of *Clean Air* included a note on the status of various noise control related codes of practice (Update, p.218). It was noted that a 1988 draft code on water sports had not been progressed mainly on account of the conflicting views of the different interest groups. The Department of the Environment's Local Environmental Quality Division has prepared a note for local authorities on possible options for controlling noise from water sports which is reproduced below with the DOE's permission.

"Noise from water ski vessels and ski mobiles, in circumstances where it is regarded as a statutory nuisance, can be controlled by provisions in the *Environmental Protection Act 1990*. These provisions could apply to ski vessels and ski mobiles being operated either on inland waters or on the territorial sea lying seaward of a local authority's shore.

"Alternatively, a local authority can make byelaws under section 76 of the *Public Health Act 1961* making it a requirement that the engines of all seaside pleasure boats (including water ski vessels and ski mobiles) are fitted with a silencer when being driven in areas of the sea where the byelaws are in force. Whilst the Secretary of State for the Home Department is the confirming authority for these byelaws he has no power to require a local authority to make them and the initiative would have to come from the local authority itself. The enforcement of all byelaws is also the responsibility of the local authority.

"Traffic of any description on any lake (except one owned or managed by a river authority or by a statutory undertaker) in a National Park can be controlled by byelaws. The power to make them is vested in any constituent local authority of a National Park by section 13(1) of the *Countryside Act 1968*. The byelaws may deal with matters of safety; the regulation of sport and recreation involving the use of boats or vessels; conservation of the amenity and natural beauty of a lake or surrounding area; and the preventing of nuisance or damage, particularly from excessive noise. Among the more detailed issues the byelaws may address are rules of navigation and speed limits; the use of silencers on boats or vessels propelled by internal combustion engines; and rules to limit noise or vibration caused by such boats or vessels.

"The Lake District Special Planning Board controls water activities in the Lake District by the use of such byelaws, adopted by the constituent local authorities, which ban usage of certain lakes for water sports and impose speed restrictions on others, such as Lake Windermere. There are no noise restrictions as such in operation, although limiting the speed of powered craft does, of course, result in lower noise levels. The Board will shortly submit to the Home Office for confirmation a byelaw which will introduce a new speed limit of 10 miles per hour on Lake Windermere.

"The use of jet-skis and the landing of these machines on the shore does not require planning permission. However, a club or business intending to set up a permanent base from which jet-skis could be operated would require planning permission to erect works and buildings, or to change the use of any existing land or buildings involved. Depending upon the circumstances, the local planning authority might consider it appropriate to apply planning conditions when granting planning permission in connection with such activities".

SICK BUILDING SYNDROME

New research from the Building Research Establishment concludes that higher standards of cleaning in office buildings and specific dust-mite reduction measures could help to combat the symptoms of sick building syndrome (SBS). BRE Information Paper 3/94 *The importance of indoor surface pollution in sick building syndrome* presents evidence that one of the causes is contamination from dust, fibres and micro-organisms found on building surfaces and in furnishings, and recommends ways to reduce indoor surface pollution in offices.

BRE's Paper addresses the relative importance for sick building syndrome of indoor surface pollution and airborne pollution, and is based on a comparison of the effectiveness of office cleaning and ambient air treatment as possible solutions; office workers were given a list of fifteen symptoms and were asked to report how many they experienced each week during the four-month study period. The Paper concludes that indoor surface pollution can be an important contributory factor in causing SBS, and identifies ways to reduce the problem at work through enhanced cleaning and paying more attention to design, furniture selection and layout in offices, particularly in older buildings. It recommends that these should be carried out alongside established practices which relate to improving building services and reducing pollution from materials and processes in the building.

Copies of IP 3/94 *The importance of indoor surface pollution in sick building syndrome* are available from the BRE Bookshop, Building Research Establishment, Garston, Watford WD2 7JR. Telephone: Watford (0923) 664444, price £3.50 (plus 35p P&P)

ACCESS TO PLANNING DOCUMENTS

A major survey of all English county and district councils and National Park Authorities published recently by the CPRE (Council for the Protection of Rural England) reveals that "inflated photocopying charges, limited opening hours, restrictive procedures and expensive publications are deterring the public from exercising their rights to comment on building proposals and local authority development plans".

*Public Access to Planning Documents*** examines the performance of local authorities in the provision of planning documents to the public in the light of policy initiatives such as the Citizen's Charter. Among the report's findings are that:

- 50% of local authorities do not make planning applications available for inspection outside their own offices and only 5% open their offices outside normal working hours;
- 25% of local authorities ignore the legal requirement to list background papers in official reports to their council committees;
- over 16% of local authorities charge £20 or more for copies of their Structure or Local Plan even when putting it out for public consultation.

CPRE points out that 'The rights of the public to comment on the impact of schemes such as housing developments, out of town shopping centres and business parks are enshrined in the law and championed in Citizen's Charters but thwarted by practical obstacles to getting involved'.

Among CPRE's recommendations are:

- a review by the Planning Inspectorate and by the Local Government Ombudsman of the effect of copying charges and restrictive access on the quality of public consultation on planning applications and development plans.
- a new duty on local authorities to supply copies of planning documents on request; and
- guidance from the Department of the Environment on charging policy and minimum standards for providing access to planning documents — an A4 photocopy should not cost more than 20 pence. (Widely varying charges was a problem highlighted by a Scottish Consumer Council/Friends of the Earth report on gaining access to public registers under Part I of the Environmental Protection Act — see *Clean Air*, Summer 1993.)

**Copies of *Public Access to Planning Documents* are available free of charge from CPRE Publications, 25 Buckingham Palace Road, London SW1W 0PP on receipt of an A4 SAE.

NO ACCESS TO INFORMATION

The Campaign for Freedom of Information, has reported the Government to the European Commission for breaching the Freedom of Information Directive.

Under the *Environmental Information Regulations 1992*, which came into force in the UK last December, the public has a right to environmental information held by public bodies. To test the Regulations, the Campaign made a series of requests for information about the British Nuclear Fuels THORP reprocessing plant. Three key bodies refused to supply any information, claiming the Regulations did not apply to them. The Campaign believes their claims are unsupportable, and says the government is breaking European law by allowing them to withhold information. The three are the Health and Safety Executive (HSE), the Radioactive Waste Management Advisory Committee (RWMAC), and BNFL itself.

- The HSE told the Campaign it was not covered by the Regulations because it had no environmental responsibilities for the nuclear industry. But the Campaign says it does, pointing to the HSE's annual report for 1988-89 which acknowledged its "substantial concern with environmental issues" which included "policy and enforcement responsibilities" for nuclear installations. The Campaign is particulalry critical of the HSE's claim that it is legally prohibited from disclosing information by a restriction in section 28 of the *Health and Safety at Work Act*. The Campaign quotes internal HSE guidance which states "Section 28 should not be regarded as a general restraint on. . .disclosure" but instead "empowers" the HSE to disclose information relevant to the purposes of the Act. The guidance adds "there will be few occasions when the Executive is required to withhold information it wished to release".
- RWMAC is refusing to comply with the Regulations on the grounds that

it is an independent body, not "under the control of" ministers – one of the Regulations' criteria. But the Campaign says that while RWMAC's *advice* may be independent the committee itself is clearly part of the government machinery. Ministers appoint its members, fund its work, set its terms of reference, require it to undertake specific tasks, must give permission before its advice can be published and can, ultimately, wind it up. Ministers must therefore be responsible for ensuring that it complies with its legal obligations.

- BNFL is a government owned company, whose shares are held by the Trade & Industry Secretary. However BNFL told the Campaign its responsibilities were no greater than those of a private company. The Campaign says this is an unsustainable argument. It quotes a National Audit Office report which revealed that BNFL was required to pursue its commercial objectives with regard to "government policy on environmental. . .matters". No private company is in this position, the Campaign says.

The Regulations implement the 1990 EC Directive on the Freedom of Access to Information on the Environment. Article 3.1 of the directive says "Member States *shall ensure* that public authorities *are required* to make available information relating to the environment. . .". But in its Guidance on the Regulations, the Department of the Environment says that it cannot provide a definitive list of the bodies covered "so organisations will need to take a view themselves" as to whether they are caught by the Regulations.

The Campaign says that by leaving it to individual public bodies to decide whether to comply the Government is in breach of its duty under the Directive – which is to *"ensure"* that bodies disclose information. In its complaint to the European Commission, the Campaign says "it cannot be permissible for the Government to deny its own responsibilities by allowing bodies which are under the control of ministers to decide for themselves whether to comply with the Regulations". The Campaign has written to the ministers responsible for the three bodies, telling them it is their duty to instruct the bodies to abide by the law.

BOOKS AND REPORTS

VALUING THE UNKNOWN
Cost Benefit Analysis and Air Pollution

S. Lanigan, Oxford Institute for Energy Studies (OIES), 1993. £14.00, ISBN 0948061766.

The paper explores issues arising from energy related air pollution in developing countries. It examines the suitability of cost-benefit analysis as a method for assessing alternative abatement strategies and helping to identify the optimal course of action. It concludes that such a method is unlikely to indicate definitively any solution to air quality problems.

REUSE, REPAIR, RECYCLE

J. McHarry, Gaia Books, 1993. £7.99, ISBN 1856750450.

A practical guide to reducing consumption and recycling waste. It looks at recycling practice around the world and provides an A-Z of information on household, office and industrial items.

THE STRUGGLE FOR POWER IN EUROPE
Competition and Regulation in the EC Electricity Industry

F. McGowan, Royal Institute of International Affairs, 1993. £12.50, ISBN 0905031679.

Drawing upon experience inside and outside the EC, this study examines the implications of the move from a monopoly industry to one based on competition. It considers the potential benefits and problems of such a reform and the major obstacles to it.

COMBUSTION ASH / RESIDUE MANAGEMENT
An Engineering Persepective

R. Goodwin, Noyes Publications, 1993. $45.00, ISBN 0815513283.

The book provides a technical assessment of the environmentally benign characteristics of combustion residues and disposal and utilisation methodologies.

GREEN BUSINESS — Sourcebook 7

L. Gooday, Institution of Mechanical Engineers, 1993. £29.50, ISBN 0852988915.

This directory is divided into two sections — Green Business Information, including books, CD-Rom, Conferences, Consultants, Courses and Green Business References which covers 270 abstracts.

REMEDIAL PROCESSES FOR CONTAMINATED LAND

Ed. Malcom Pratt, Institution of Chemical Engineers, 1993. ISBN 0852953100.

This book is based on contributions to a symposium organised by the IChemE. The papers presented look at a range of techniques for cleaning up contaminated land. It covers soil washing, biological remediation, mobile incineration and current UK technology and developments.

IMPROVING ENVIRONMENTAL PERFORMANCE: A GUIDE TO A PROVEN AND EFFECTIVE APPROACH

S. Bragg and others, Technical Communications, 1993, £27.80. ISBN 0946655782.

Written by environmental managers at Arthur D. Little consultants, the publication aims to provide practical advice based on experience with clients. It looks at planning, implementing, auditing and measuring environmental performance and is illustrated with case studies and examples of policy statements.

ENERGY EFFICIENCY POLICIES

V. Anderson, Routledge, 1993, £8.99. ISBN 0415086973.

The book aims to apply the New Economics approach — which encompasses our environment and domestic activity as well as the industrial and financial economy — to government policies to promote energy efficiency and reduce CO_2 emissions. It examines trends in energy use, outlines current OECD policies and recommends fifteen policies for reducing energy consumption.

PERSONAL TRANSPORT AND THE GREENHOUSE EFFECT

P. Hughes, Earthscan, 1993, £14.95. ISBN 1853831697.

A detailed analysis of policy options available for limiting carbon dioxide emissions from transport. It looks at climate change, emissions from transport, technical fixes and the need to travel.

IN OUR BACKYARD

A Guide to Understanding Pollution and its Effects

T. Wagner, International Thomson Publishing, 1993, £17.50. ISBN 0442014996.

An introduction to environmental pollution covering surface and groundwater, air pollution, waste, energy, pesticides and household pollution. Although written from a US perspective it provides a comprehensive and accessible overview.

ENVIRONMENT BUSINESS DIRECTORY 1994

Environment Business, 1994, £65.00. ISBN 0951837532.

The third edition of this directory. Its listings include regulators, consultants, lawyers, laboratories, trade associations and NGOs.

AIRCRAFT EMISSIONS AND THE ENVIRONMENT:
COx SOx HOx & NOx

L. Archer, Oxford Institute for Energy Studies, 1993, £14.00. ISBN 0948061790.

The study describes the actual and potential damage arising from air travel today and in twenty years time. It looks at fleet size and projected growth and quantifies fuel consumption and emissions. The impact on the atmosphere and control technologies are also assessed.

THE ENVIRONMENTAL PROTECTION ACT 1990
Text and Commentary — second edition

S. Tromans, Sweet and Maxwell, 1993. £27.00. ISBN 0421507802.

An expanded edition of this text, which includes the full text of the Act and is updated to mid 1993.

BLUEPRINT 3, Measuring Sustainable Development

David Pearce, Earthscan, London, 1994. £9.95. ISBN 1-85383-183-2.

In their sequel to *Blueprint for a Green Economy* David Pearce and his colleagues have made a significant contribution to serious debate of sustainability in the UK. They advance understanding of key concepts and the factors which limit their practical utility. They attempt quantitative assessment of the sustainability of key sectors of our economy. Finally they address the politics of change on the scale which is likely to be necessary. *Blueprint 3* is a succinct and challenging complement to *Sustainable Development — the UK Strategy.*

BRITISH STANDARDS

The following British Standards have been published recently and are available from BSI Publications, Linford Wood, Milton Keynes, MK14 6LE:

Water Quality
BS 6068: Section 1.4, Part 1 Glossary, An Additional 18 terms
BS 6068: Section 1.8, Part 1 Glossary, An Additional 66 terms

Air Quality
BS 1747: Part 11: 1993, Methods for Measurement of Air Pollution, Determination of a black smoke index in ambient air
BS 1747: Part 12: 1993, Methods for Measurement of Air Pollution, Determination of the mass concentration of ozone in ambient air: chemiluminescence method.

FUTURE EVENTS

18-20 APRIL — DIESEL PARTICULATES AND NOx EMISSIONS

Short course designed for engineers, researchers and teachers in diesel engines, combustion and pollution. Suitable both as an overview for those new to the area and to provide wider awareness for those already working in the field.

Venue: Weetwood Hall, Leeds.

Details: Miss Julie Charlton, Department of Fuel & Energy, University of Leeds, Tel: 0532 332494.

19-20 APRIL — RENEWABLE ENERGY — ITS COMMERCIAL EXPLOITATION

Conference examining experience to date with renewable energy projects, including problems of financing and planning consents, operational experiences and how these will affect new and potential operators.

Venue: Forte Crest Regents Park, London W1

Details: Sarah Ashmore, IBC Technical Services, Tel: 071-637 4383.

20 APRIL — ENVIRONMENTAL MANAGEMENT SYSTEMS FOR SCOTLAND

Conference to address the need for organisations to manage their environmental performance by examining the current national and EU environmental regulations and legislation and other relevant standards.

Venue: The Balmoral Hotel, Edinburgh.

Details: Amanda Wright, IBC Technical Services, Tel: 071-637 4383.

21-22 APRIL — THE WASTE MANAGEMENT REGULATIONS AND THE MEANING OF “WASTE”

The conference will provide a full briefing on what the new Regulations require, how to comply with them and how to avoid criminal sanctions.

Venue: The Brewery, Chiswell Street, London EC1.

Details: Helen Williamson, IBC Legal Studies & Services Ltd, Tel: 071-637 4383.

16-20 MAY — BUILDINGS AND THE ENVIRONMENT

International conference with programme including: methods of assessing the impact of buildings on the environment; building design and operation; energy labelling and carbon dioxide calculations; energy efficient technology; environmental problems; the re-use of materials; and local and indoor issues such as health and pollution.

Venue: BRE, Garston, Watford.

Details: Buildings and Environment Event Group, Building Research Establishment, Fax: 0923 664083.

17-18 MAY — ADVANCES IN ENVIRONMENTAL AUDITING

Two day conference to examine the practical lessons learned by companies implementing an EMS and audit programme in compliance with BS7750 and the EU eco-audit regulation. It will provide delegates with information on standards and practices in EMS and eco-audits worldwide.

Venue: Cafe Royal, London W1.
Details: Amanda Wright, Tel: 071-637 4383.

22-24 MAY — INTRODUCTION TO WASTES MANAGEMENT

Course designed to ensure a thorough basic understanding of all aspects of waste management in the UK. Will be of value to those joining the field of wastes management in both the public and private sectors.

Venue: Knuston Hall, Irchester, Northamptonshire.
Details: Training Department, IWM Business Services Ltd, Tel: 0604 20426.

24 MAY —
NOISE REGULATIONS — ARE THEY FALLING ON DEAF EARS?

Meeting to bring participants up to date on noise at work regulations in EU and UK. Will also demonstrate how employers can avoid costly noise claims which are estimated to cost industry several million pounds.

Venue: Society of Chemical Industry, 14/15 Belgrave Square, London SW1.
Details: SCI Conference Secretariat, Tel: 071-235 3681.

24-26 MAY — PRINCIPLES OF ENVIRONMENTAL MANAGEMENT

Training course covering all aspects of the subject, including control of environmental loss, identification of critical issues, auditing and inspecting, BS 7750, CEMAS and legislation. (Other course dates: 19-21 July, 20-22 September, and 22-24 November.)

Details: Irmela Jebsen, DNV Technica Ltd, Tel: 071-357 6080.

2 JUNE — AUTHORISATION OF PART B PROCESSES

NSCA training seminar.

Venue: NEC Birmingham.
Details: NSCA, Tel: 0273 326313.

7-8 JUNE: NEW FUELS AND VEHICLES FOR CLEAN AIR

Motor vehicles are responsible for a major portion of air pollution problems and therefore fundamental to environmental protection. This conference sponsored by New Fuels Report will look at taxation policy, biofuels and variations to existing fuel types as well as improvements to vehicles themselves.

Venue: Hotel Intercontinental, Luxembourg.
Details: New Fuels Report, PO Box 7167, Ben Franklin Station, Washington DC 20044. Fax: (+1-703) 416 8543.

18-26 JUNE — GREEN TRANSPORT WEEK

Coordinated by the Environmental Transport Association, the week will focus people's attention on modes of travel which are less damaging to the environment. Organisations taking part include the National Trust, English Nature, Age Concern and Transport 2000.

Details: Green Transport Week Coordinator, 0832 828882.

24 JUNE-3 JULY —
GLOBAL FORUM 94: CITIES AND SUSTAINABLE DEVELOPMENT
Follow up to Rio 92 (the Earth Summit), Global Forum 94 will focus on the world's cities where half the world's population will be living by the year 2000. The aim is to develop practical action plans over a ten day core programme of conferences, exhibitions, educational activities, seminars, cultural and social events, workshops and open debates. Hosted by City of Manchester in partnership with local citizen groups, the business community and the Centre for Our Common Future. (See also article in this issue of *Clean Air*).
Venue: Manchester.
Details: Global Forum 94, Fax: 061-234 3743.

28 JUNE —
CONTAMINATED LAND: LEGAL LIABILITIES AND PLANNING ISSUES
Course looking at issues related to land contaminated by waste, and where this presents a threat to water quality and the impact of waste legislation on land reclamation schemes.
Venue: The Rotherham Moat House, Rotherham.
Details: Training Department, IWM Business Services Ltd, Tel: 0604 20426.

NSCA TRAINING SEMINAR

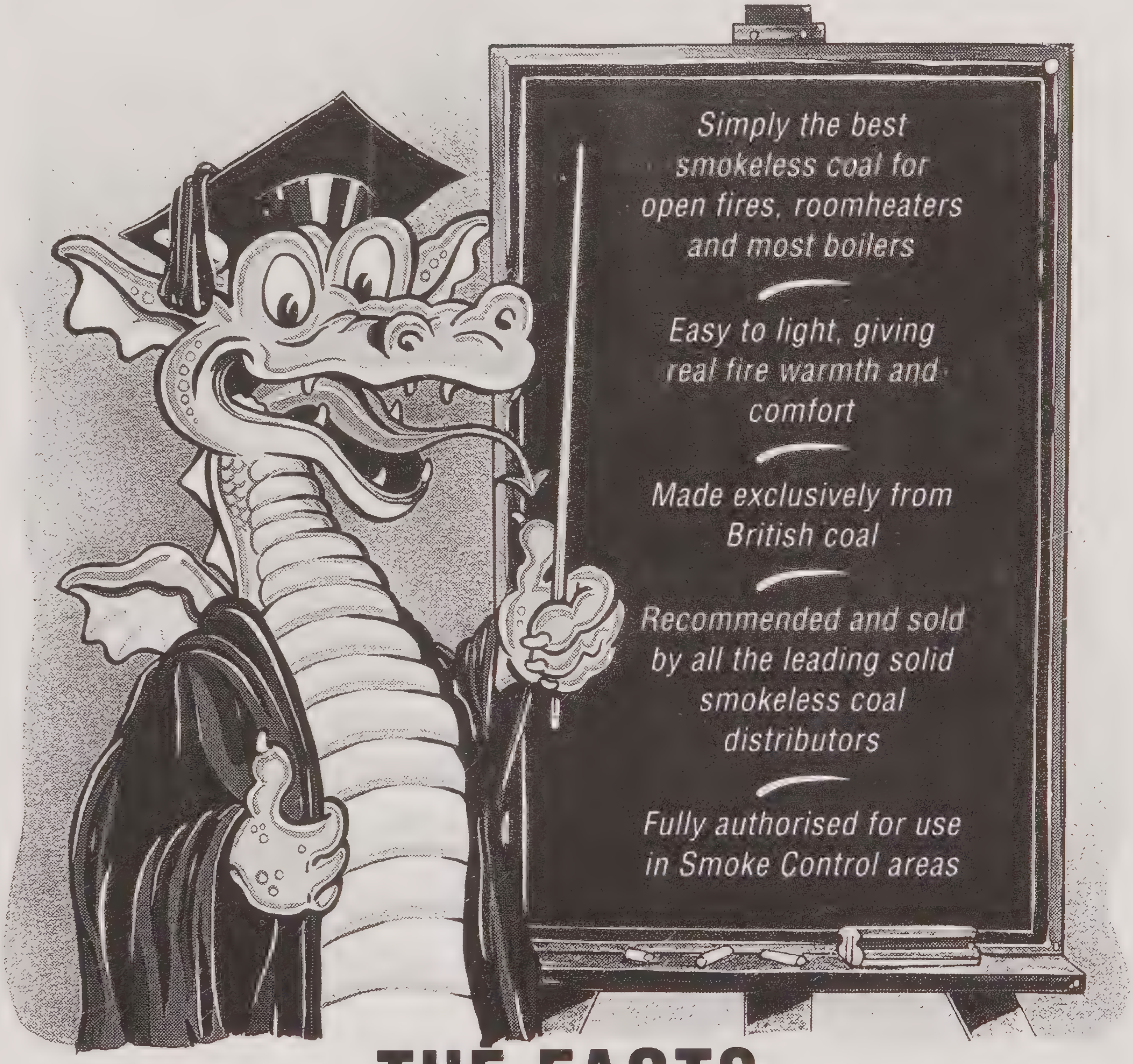
UPGRADING PLANS
FOR
PART B PROCESSES

Thursday 2 June 1994
Gallery Suite - National Exhibition Centre
BIRMINGHAM

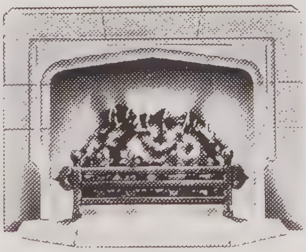
For a copy of the Seminar Brochure ring 0273 326313
National Society for Clean Air and Environmental Protection
136 North Street - Brighton BN1 1RG

CLEAN AIR INDEX
VOL 23, 1993

Access to information 93
Airborne dust monitoring, Mark & Hall 193
Air pollution control, N. Ireland 42
Air Pollution and visibility, Lee 30
Asthma 92
Carbon dioxide, UK programme 5
Chemical release inventory 12
Clay target shooting 140, 218
Clean Air Act 70, 95, 115
Climate change 4, 35, 220
Codes of practice 218
Contaminated land 41
Crop burning 90, 164
Earth summit 55, 95, 109
Economic instruments 4, 108, 130
Energy efficiency 6
Energy costs 3
Environmental assessment 130, 134
Environmental damage 170
Env. Protection Act 42, 68, 93, 140
Environmental quality 112
Fuel consumption 9
Greenhouse effect 37
Incineration 58, 91
Integrated pollution control 130
Landfill 36, 41
Local government reorganisation 17
Local Air Quality Management, NSCA workshop 24
Methane 35
Monitoring, air 27, 43, 121
Monitoring air pollution, Muir 173
Motorway charging 118
Municipal waste 35
Nat. Env. Technology Centre 139
N. Ireland 42, 58
Noise 61
Noise & Stat. Nuisance Act 219
Noise policy, NSCA discussion document 19
NO_2 diffusion tube monitoring, Fox 189
Planning and Pollution Control, Miller 183
Planning Policy Guidance Notes 59
Polluter pays principle 3
Pollution, fees and charges 42
Prescribed Processes & Substances 68
Radiation emergencies 45
Respiratory problems 92
Risk assessment, Ball 81
Scottish Environmental Protection Agency 29
Smoke control programmes 70
Speed limiters 66, 141
Sustainable development 55, 109
Tobacco 137
Transport 9, 44, 59, 118, 141, 169
Unleaded petrol, NSCA policy 169
Vehicle emissions 9, 44, 45, 66, 120
VOC emissions, petrol storage 15
VOC emissions, UK strategy 13
Warren Spring Laboratory 57, 139
Waste Management 58, 77


Simply the best smokeless coal for open fires, roomheaters and most boilers
Easy to light, giving real fire warmth and comfort
Made exclusively from British coal
Recommended and sold by all the leading solid smokeless coal distributors
Fully authorised for use in Smoke Control areas

THE FACTS
BEHIND THE LEGEND



COALITE
THE HEAT IS LEGENDARY

Coalite Smokeless Fuels, PO Box 21, Chesterfield S44 6AB. Tel. 0246 822281.

Enviro Technology Services plc

STANDARD OPSIS SYSTEM PACKAGES

For Local Authorities

For air quality monitoring, the AR500LA measures both criteria pollutants and hydrocarbons. The standard package measures Benzene, Toluene, $N0_2$, $S0_2$ and 0_3.

Upgradeable to include other gases.

For Emissions Monitoring

Standard packages are available for non-extractive emissions monitoring of incinerators or combustion plant. One system will operate up to twelve lightpaths, monitoring several points in a process and/or multiple stacks. Systems will measure $N0$, $N0_2$, $S0_2$, $C0_2$, H_20, HCl, Hg, NH_3 and others.

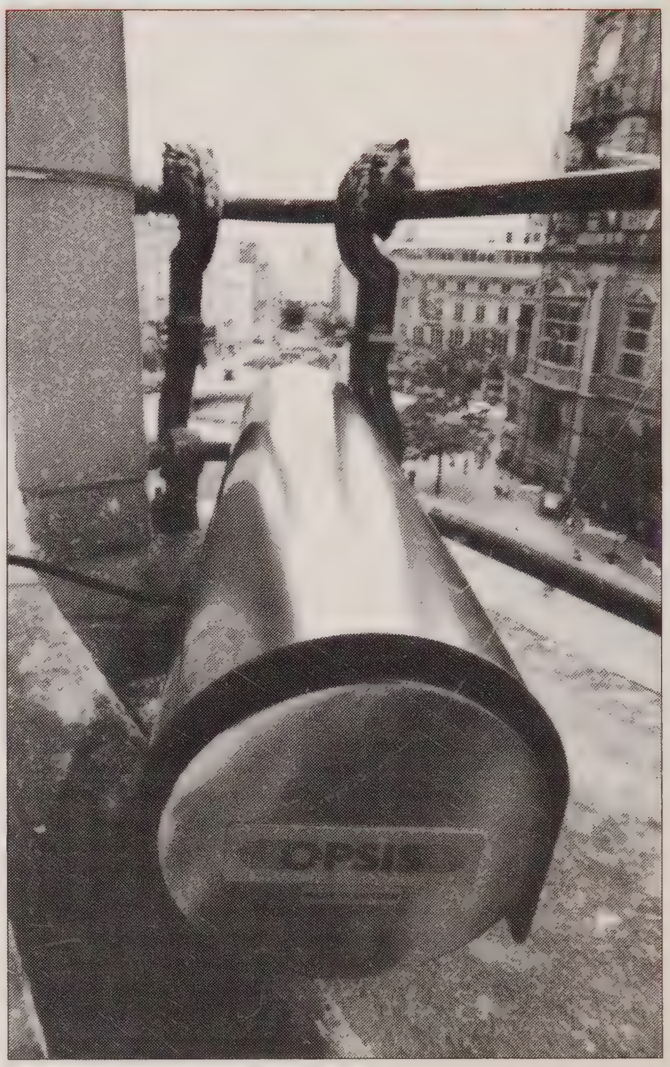
Opsis also accepts process inputs (flow, temperature, pressure etc) allowing a full range of CEM reports for HMIP etc.

Upgradeable to include other gases.

Emissions Computers

Running OPSIS' EmVision and Stat 500 software, these computers will accept logged data from multiple inputs for a full range of display, reporting and stastical functions on air quality or process emissions.

Opsis' Approvals include TÜV and UMEG.



Enviro Technology Services plc,
Environment House, Dudbridge Road, Stroud, Glos GL5 3EE
Tel: (0453) 751641 Fax: (0453) 757596

nsca

CLEAN AIR
AND ENVIRONMENTAL PROTECTION

SUMMER 1994

Volume 24 **Number Two**

NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION

Graseby Andersen
are now manufacturing
environmental monitoring instruments
in the UK for:

PM10
particulates
& VOCs

Phone us now on 0689 877767
for an information pack on ambient
and stack monitoring applications

GRASEBY
ANDERSEN

GRASEBY ANDERSEN LIMITED
RIVER HOUSE, LAGOON ROAD, ST. MARY CRAY, ORPINGTON, KENT UK BR5 3QX
TEL: 0689 877767 FAX: 0689 876661

SUMMER 1994
VOLUME 24
ISSN 0300-5734

CLEAN AIR

nsca

Publishing Director:
Dr. Tom Crossett
Secretary General, NSCA

Editor:
Loveday Murley

Assistant Editor:
Mary Stevens

Information/PRO:
Tim Brown

Advertising:
Sally May
Rates on request.

CLEAN AIR is the official journal of the Society but the views expressed in contributed articles are not necessarily endorsed by the Society.

CLEAN AIR is issued free to Members and Representatives of Members.

CLEAN AIR Subscription for 1994 — £22.00

Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements are made.

CLEAN AIR is printed and published in England by the National Society for Clean Air and Environmental Protection,
136 North Street
Brighton BN1 1RG
Tel: Brighton (0273) 326313
Fax: Brighton (0273) 735802

CONTENTS

Editorial 43

NSCA News and Views
— Improving Air Quality: Air Quality Management and Standards 45
— Vehicle Emissions and Air Quality 52
— Vehicle Emissions — NSCA Roundtable 53
— Reducing Emissions of Hazardous Chemicals to the Environment 56
— Paying for our Past 58
— Ozone 61
— Upgrading Plans for Part B Processes 61
— News from NSCA Divisions 62
— NSCA Environmental Review 63
— NSCA Policy Statements and Replies to Consultation Documents 64

Reports
— Smoke Control Programmes 1993/94 65
— Non-CO_2 Greenhouse Gases: Why and How to Control 71
— Approaches to the Calculation of Discharge Stack Heights for Odour Control 74

Update 93

Books and Reports 96

Future Events 100

Advertisers
— Graseby Andersen cvr ii
— Enviro Technology Services Plc cvr iv

NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

(Founded 1899)

Registered Charity, Number 221026

PRESIDENT

Professor The Lord Lewis, KT, FRS

IMMEDIATE PAST PRESIDENT

The Baroness Platt of Writtle, CBE, DL, FEng

VICE-PRESIDENTS

Mr. K. Collins, MEP; The Rt. Hon. The Earl of Cranbrook, DSc, DL;
Wayne David, MEP; John Edmonds; Dr. Caroline Jackson, MEP; Robert Jones,MP;
Air Commodore John Langston, CBE; Sir John Mason, CB, DSc, FRS;
The Rt Hon Lord Nathan; Sir Hugh Rossi; Mr. J. Speirs;
Gareth Wardell, MP

CHAIRMAN OF COUNCIL

Mr. K.G. Kaufman

DEPUTY CHAIRMEN OF COUNCIL

Cllr Dr. J.R.P. Evans, Mr. G.W. Barrett

IMMEDIATE PAST CHAIRMAN OF COUNCIL

Professor J.S. Harrison

HONORARY TREASURER

Mr. R. Hill

SECRETARY GENERAL

Dr. R.N. Crossett

HONORARY SECRETARIES OF NSCA DIVISIONS

Scottish Division: Calum MacDonald — Telephone: 041 227 5552
City of Glasgow DC, Environmental Health Dept.,
23 Montrose Street, Glasgow G1 1RN

Northern Ireland Division: Mervyn Fleming — Telephone: 0232 401805
67 Kilwarlin Road, Hillsborough, Co. Down BT26 6EA

Northern Division: Keith Atkinson — Telephone: 0325 352692
30 Loraine Crescent, Darlington, Co. Durham DL1 5QU

North West Division: R.N. Turner — Telephone: 051 443 4731
45 Down Green Road, Harwood, Bolton BL2 3QD

Yorkshire & Humberside Division: Stephen Carden — Telephone: 0924 295391
Head of Health, City of Wakefield MDC, 29 King Street, Wakefield WF1 2SY

West Midlands Division: J. Sweetland — Telephone: 0952 202558
Senior EHO, Pollution Control, Wrekin Council, Civic Offices, PO Box 212, Telford TF3 4LB

East Midlands and Eastern Divisions: D.R. Romaine — Telephone: 0332 255228
Derby City Council, Housing and Environmental Services Dept., The Council House, Corporation Street,
Derby DE1 2FD

South East Division: J.J. Beagle — Telephone: 081 452 0203
19 Oxgate Gardens, Brent, London NW2 6EA

South West Division: J.A. Jefferies — Telephone: 0272 223343
Environmental Health Services, Bristol City Council, Brunel House, St. Georges Road, Bristol BS1 5UY

South and Mid Wales Division: T. Jones — Telephone: 0495 766775
28 Maes-y-celyn, Griffithstown, Pontypool, Gwent

EDITORIAL

GAPS IN THE TOOLKIT

Full marks to the Department of the Environment for fulfilling its promise to consult on a national framework for air quality management. NSCA's own response to "Improving Air Quality" is reproduced in this issue; we know that many other organisations have responded enthusiastically to the DOE proposals, and we hope to see the momentum of consultation carried through into firm proposals.

It is important to get the framework of responsibility for air quality management right, and we have commented in some detail on our preferred structure. The next step is to identify and remedy deficiencies in the "tools" which are necessary for effective action.

Looking across the sectors, NSCA has a long history of campaigning on smoke control in the domestic sector. With a few exceptions, the controls are already in place. For industry, the *Environmental Protection Act* provides most of the powers necessary, but our experience in HMIP consultations on BPEO and in bringing together local authorities and the Part B process operators to discuss upgrading plans suggests that techniques of environmental appraisal will need much refinement before resources for environmental protection can be directed where they will do most good. As the major nuisance of stubble burning disappears we will need to evaluate the adequacy of other controls over air pollution from agriculture.

The Number One air quality problem for most urban areas is now road transport, and it is here that the gaps in the toolkit are becoming most apparent. The Society recently brought together the wide range of organisations with an interest in controlling vehicle emissions, to evaluate some of the technical and enforcement issues surrounding vehicle emission standards. One of the problems is that there is such a wide range of interests without a coherent strategy for reducing traffic pollution to acceptable levels. We continue to promote good practice and information exchange in this area.

Having contributed to the development of strategic thinking on air quality management we must now turn our attention to the practicalities. We shall have to define ways in which local authorities, regional groupings, industry, consultancies and national organisations can interact beneficially within the new framework. We shall have to determine what new powers or information they will need to deliver clean air in a cost-effective and socially acceptable way. We can only find realistic answers to these questions by drawing on the whole spread of expertise within the Society and we hope that you will be willing to make your vital contribution.

ENVIRONMENTAL PROTECTION 1994
24 - 27 OCTOBER
WINTER GARDENS - BLACKPOOL

61st NSCA Annual Conference and Exhibition

Keynote Address by Lord Crickhowell
Chairman of the National Rivers Authority
Practical Action for a Sustainable Future

SESSION SUBJECTS

- sustainability indicators
- nuclear waste
- industrial pollution control
- noise
- asthma
- renewable energy
- agricultural pollution
- waste minimisation
- contaminated land
- vehicle emissions
- technical seminars
- water pollution
- electromagnetic fields

For a copy of the brochure contact
NSCA on 0273 326313

ADVANCE NOTICE
NSCA SEMINAR

THURSDAY 8 DECEMBER 1994

VEHICLE EMISSIONS

National Exhibition Centre
BIRMINGHAM

NSCA NEWS & VIEWS

IMPROVING AIR QUALITY
AIR QUALITY MANAGEMENT AND STANDARDS

DOE Discussion Paper, March 1994

This paper discusses the policies and procedures required for the setting, achievement and maintenance of air quality standards. It addresses the need for an overall framework for managing — and improving — the quality of our air.

NSCA Comments

Where appropriate, comments are referenced to paragraphs in the consultation paper, copies of which can be obtained from the DOE.

1. Introduction

NSCA welcomes this consultation paper. It takes air pollution seriously and acknowledges frankly the extent of air quality problems in the UK. It recognises the need for an effects-based approach to air quality management (AQM) expressed in terms of common air quality standards (AQS) and management regimes tailored to local circumstances. It sketches out the broad framework for future control, but seeks to establish consensus on the details of such a framework. The outcome of this consultation process should embody such consensus and lead to cost-effective improvements in environmental quality which are consistent with wider social and economic objectives. As the EC Air Quality Management Framework Directive takes shape, the UK should contribute constructively on the the basis of its experience in developing an integrated air quality management strategy.

2. Air Quality Standards

We agree that AQ standards are the appropriate means of securing an effects-based approach, but the standards chosen must be comprehensive and command public confidence. Where air quality is currently good, effects-based policies must not permit significant deterioration of air quality; this distinction must be made in any consideration of AQ bandings. Further work is needed to fill gaps in our knowledge, in particular on the chronic health effects of air pollution, the synergistic interaction between pollutants — the "cocktail effect". Many of these gaps in knowledge will take a long time to fill and meanwhile there must be realistic precaution.

Costs, benefits and precaution

There is potential for confusion in the assertion (3.13) that air quality standards should reflect not only the best available scientific evidence but also the balance of costs and benefits. There is need to distinguish clearly between what is desirable on grounds of health, conservation or precaution and what is practicable under prevailing or prospective circumstances. We welcome the form of recent recommendations by the Expert Panel on Air Quality Standards (EPAQS) which have drawn a helpful distinction between what is desirable in the opinion of medical experts now and in the longer term. EPAQS remits to Government the task of setting the timetable for attainment of the more stringent standard which the panel believes to be ultimately justified. In the real world, political and economic reality will dictate the speed at which standards are attained. We do not yet know what the Government's response to the EPAQS standards will be, but the timetable for action will need to be justified on the basis of economic and social costs. The EPAQS approach avoids the risk of confusing science with politics and should be followed when setting standards for other pollutants.

There is a parallel with the critical loads/target loads debate. Critical loads represent the "ideal" standard and long-term objective, whilst target loads are "working" standards which incorporate the political realities.

Further discussion is required on this matter and terminology should be more clearly defined. One possible distinction could be between:

> **Standards**, which should be environmental quality objectives defined in terms of health or conservation effects or agreed levels of precaution.
>
> **Targets**, which should be related to standards but reflect economic and social realities. It should be made clear, case by case, whether they are mandatory or advisory. Bearing in mind the complexities and uncertainties of AQM, mandatory targets should be the exception and the obligation on regulatory authorities should be to have an adequate management plan and to enforce measures within it.

There is a need for objective criteria for determining when it would be appropriate to set AQSs on conservation or amenity grounds as an alternative or in addition to health considerations. (3.13) A clear link is needed between AQSs and objectives in maintaining biodiversity.

Banding criteria

We accept the value of a banding system for standards (3.15), but the current DOE air quality bandings and their terminology have failed to command confidence; the proposed framework is unlikely to improve matters. The very coarse banding for AQ management purposes does not match well the finer bandings already used for AQ advice to the public. There is clearly a need for an additional band or bands between the alarm and long term acceptability thresholds. Alarm levels are likely to be breached only rarely, if at all, and because of climatic factors are often unpredictable. They may not be susceptible to short-term local controls, although contingency plans such as traffic limitation measures should be considered where they would prove effective. Below this will be a spectrum between areas where the alarm level may be within sight and medium-term management measures are needed, and areas where the acceptability level could be reached with the assistance of longer-term planning measures. A possible hierarchy of banding would thus be:

Alarm	Short-term acute effects
Unacceptable	Chronic effects, may be above no observed effects level
Acceptable	Incorporating precaution, amenity and safety factors
Background	Within natural variability

Banding should take account of the different propensity of pollutants to act over short term and long term, and their carcinogenic properties.

Further guidance is necessary on the question of where to monitor for compliance with standards. Air quality is variable on a very local scale and the potential for inconsistency is large.

Relation with EPA controls

We do not agree with the suggestion (3.17) that the proposed framework for AQM is immediately consistent with the philosophy of legislation on industrial emissions control. The latter relies heavily on consistent application of technological standards irrespective of whether an AQS is exceeded, particularly in respect of Local Authority Air Pollution Control. HMIP's continuing discussions on BPEO methodology aim to take more account of environmental quality standards, but operators and regulators will have to gain experience in environmental impact assessment before the potential flexibility of current legislation can be exploited to the full.

3. Meeting and Maintaining Air Quality Standards

We believe that the policy hierarchy is more complex than set out in (4.4), which creates the impression that policies are either national or local. One of the most important features of an effective local air quality management system is likely to be national guidance on policies which should be applied locally if circumstances are appropriate, and upon the criteria which should be used to determine application. Equally, local management strategies will need to take account of regional and national objectives. This point was made clearly at the Local Air Quality Management meeting which the Society organised in February 1993, prompting the concept of ‘Local Choice From a National Menu.’

Local choice from a national menu of management options embodies the principle of subsidiarity — decisions taken as close to home as appropriate. However there must be a sufficiently large menu of management tools from which to choose. The framework for control of **industrial** air pollution is now largely in place. **Domestic and commercial/institutional** emissions are generally well controlled although some additional measures would be helpful. Measures to control emissions from **transport** and **agriculture** are currently inadequate.

Economic instruments

We would welcome a more cautious view to the relevance of economic instruments to environmental protection than has been apparent in some other recent policy statements. (4.6 et.seq.) To date there have been very few instances where economic instruments have delivered environmental improvement more cost-effectively than regulation. Even in the quoted example of lead in petrol, the most significant improvement in air quality was produced by a regulation reducing the level of lead in petrol. The subsequent introduction of differentials in petrol tax, though welcome, has had a less pronounced effect. The relative effectiveness for economic instruments and regulation must be judged on a case by case basis; we believe that the scope for economic instruments may prove to be limited. The aim should be to continue to refine our understanding of the factors which determine the cost effectiveness of particular types of measures and devise the optimum package of financial incentive, regulation and education. It should be accepted also that the optimum will change with time.

Hotspots

The precise definition of pollution "hotspots" (4.18) is unclear and should be related to proposals for AQS banding. More explicit criteria relating to specific pollutants and the size of area affected will be important in guiding monitoring priorities; by some criteria one-third of the UK population lives in a NO_2 hotspot.

Smoke control

Despite the overall success of smoke control programmes (4.22), the WHO guidelines for SO_2 are still breached in the UK. The promised introduction of regulations to control the sale of unauthorised and high-sulphur domestic fuels should not be delayed further.

Transport

Under current legislation the potential for local influence over road vehicle pollution (4.26) is largely limited to planning measures. It should be noted that some traffic management schemes and other local infrastructure measures have the potential to worsen air quality by disrupting or displacing traffic flow. Targeting the small proportion of road vehicles responsible for the majority of pollution — gross emitters — is attracting interest in air quality management circles, as one of a number of policy options which could be deployed in any strategy to meet air quality standards. We seek to establish consensus on priorities for enforcement in this area.

Planning

The Society is keen to see a more robust approach to transport planning than that set out in 4.25. Guidance from Government should become more quantitative as confidence builds in the underlying information, and local authorities should be obliged to demonstrate a response to this guidance in the packages which they submit for central funding. This approach is already established in the US and experience there should be carefully evaluated.

Where measures aiming to secure improvements in air quality can be implemented in the planning process (4.27), wider planning and sustainability objectives must be reconciled; for instance traffic-generating development should not automatically be forced out of city centres to greenfield sites. The updated Planning Policy Guidance

(PPG) on Planning and Pollution has yet to be published, but it may be appropriate to extend current planning policy guidance on this question, perhaps to include a PPG specific to air quality.

The training of planners in air quality related issues is essential if they are to contribute to the reduction of pollution levels to the acceptability threshold. Examination of the American experience will be important since the requirements of the 1990 Amendment to the Clean Air Act (CAA) and the Intermodal Surface Transport Efficiency Act (ISTEA) has meant that 50% of the planning staff are working on air quality problems in severe non-attainment areas – a situation which has created an enormous training problem. Shortage of qualified staff has also been identified jointly by the Department of Transportation and the Environmental Protection Agency in their triennial report to the President as a major obstacle to environmental protection in such areas.

4. A New Framework for Local Air Quality Management

We welcome the commitment to integration and coherent arrangements for local management of air quality. The checklists at 5.8 and 5.9 of the key elements of an air quality management system and the organisational arrangements which would make it work are comprehensive. However their elaboration in the remaining paragraphs of section 5 tends to underestimate the tasks of creation and co-ordination of an effective, devolved system which would meet local and national objectives at least cost. In particular, central government should seek consensus on the spatial and temporal resolution requirements for monitoring networks, devise ways of targeting resources to establish and maintain networks, and promote access to the resulting quality assured data. These issues are addressed in the Society's comments on the earlier consultation paper *The Future of Air Quality Monitoring Networks in the UK.*

Monitoring and modelling

We cannot agree (5.10) that the essential tools for identifying areas at risk are all now sufficiently developed. Much uncertainty surrounds the appropriate siting of monitoring equipment (5.11). The use of emissions inventories is still imperfectly understood (5.12) and they are not readily available in the right form for application to all regions of the country. The use of complex computer assisted modelling techniques (5.13) is subject to considerable uncertainty, both in terms of the suitability of different programmes, and their practical application. To ensure consistency of approach by different local authorities there is a major requirement of training and technical advice on dispersion models. Impartial guidance is needed on appropriate models, suitable input meteorology and emissions data, and the likely uncertainty in answers. Refinement of modelling and forecasting techniques are particularly important in forecasting alarm threshold episodes so that appropriate measures can be taken immediately; the record of forecasting "poor" air quality episodes in the UK to date verges on the embarrassing.

While commitment to continued development of methodology for compilation of emission inventories and dispersion models is welcome, more effective arrangements for exchange of views among potential users may be necessary. The National

Environmental Technology Centre (NETCEN) and Investigation of Air Pollution Standing Conference (IAPSC) might fill an important role in this respect. The Quality of Urban Air Review Group (QUARG) should be maintained as a source of authoritative advice, and the Meteorological Office will have a particular contribution in the use of emissions data to forecast air quality. NSCA is keen to maintain its own reputation as a forum for information exchange and policy development.

While it would not be sensible to place a statutory duty on all local authorities to monitor air quality (5.15), there should be a duty to assess the need for such monitoring, using criteria which had been agreed centrally. This might be one element in a statutory requirement to draw up a local air quality plan.

Local air quality plans and management strategies

The central conclusion of the 1993 NSCA Local Air Quality Management Seminar was that the key factor for success in air quality management was clear identification of an air quality manager. We welcome the acknowledgement (5.20) that responsibility for key elements of implementation will fall to local authorities. We believe that this role is capable of consolidation and extension to create a more coherent approach to local air quality management. In this respect it is hard to reconcile the plans to transfer local authority air pollution control powers to the Scottish Environmental Protection Agency in Scotland. The Society still awaits a satisfactory explanation for the rationale behind this proposal, which runs counter to the spirit of this current discussion paper and would leave Scottish local authorities with very limited powers to manage air quality.

Although there is not a strict parallel between air and water quality, the integrated catchment management approach adopted by NRA may have lessons for air quality management. Clear and coherent obligations could then be placed on the managers of polluting activities and those who regulate and advise them. We believe that such a framework could be based on a statutory requirement on all local authorities to prepare local air quality plans (LAQPs). LAQPs would use centrally-agreed criteria to review the state of local air quality and future trends. Plans would be approved centrally. Assessment could be based on relatively simple monitoring and modelling techinques. If certain criteria were reached, a requirement to develop a local air quality management strategy (LAQMS) would be triggered. This might include a requirement to take account of air quality targets in Unitary Development Plans and Structure Plans, and to identify and secure agreement on specific local management strategies likely to improve air quality most cost-effectively. LAQPs and LAQMS would be reviewed and the conditions attached to them adjusted periodically. We urge that financial support be made available for pilot demonstration schemes as soon as possible.

More thought must be given to the integration of local air quality management with regional and national objectives. Some aspects of air quality management clearly transcend local authority boundaries. To some extent, voluntary local authority groupings have already coalesced into airshed management units and one element in the approval of LAQPs could be demonstration that account has been taken of neighbouring authorities.

One of the Society's aspirations for the Environment Agencies would be to develop a comprehensive and well integrated environmental management structure at sub-national level, but we recognise that progress is likely to be limited in the immediate future. As an interim measure there should be consolidation of existing local authority groupings, subject to advice provided centrally by DOE and its equivalents. There will be a need to consider appropriate levels of co-operation; for instance metropolitan areas will often represent a coherent airshed management unit which coincides with political boundaries, enhancing the prospect of an integrated management approach. Some shire areas, however, may be subject to a large proportion of transboundary pollution from nearby conurbations or aggregations of point sources, and will benefit from broader co-operation.

Any requirement to produce an LAQP, and to develop a LAQMS where appropriate must be statutory. Recourse to voluntary powers would be inadequate, running the same risk as the current approach to AQ monitoring where coverage is patchy and effort is not targeted most effectively. Where the requirement to develop a LAQMS is triggered, considerable resources are likely to be needed. More monitoring and modelling work may be necessary, and any strategy would require consultation and implementation. We see no alternative to central funding of agreed strategies through the rate support grant. Again, to rely on voluntary arrangements would be to risk the misallocation of resources. Allocation of resources should be in proportion to the extent of the problem and the likely need for wider consultation and co-operation, and should be ring-fenced so that priorities are addressed consistently.

National guidance

Responsibility for strategic assessment of air quality and the factors which influence it, for allocation of resources, agreeing plans and strategies and advising Government on the need for additional resources of powers would, in an ideal world, be the province of an independent and accountable Environment Agency. However current plans for the Agencies are much more narrowly drawn and it seems unlikely that they would be given such a remit; responsibility is more likely to fall to DOE and it equivalents in Scotland, Wales and Northern Ireland. It is perhaps a comment on the current state of confidence in environmental regulation that many Society members would prefer to see overall co-ordination of AQM remaining with DOE, rather than transferred to the notionally independent Environment Agencies.

Whoever takes on the role of strategic assessment, there will ultimately be problems of conflict of interest in determining priorities for action. In these circumstances, we would welcome the continued use of independent advisory bodies and review groups which already provide valuable independent guidance to assist in the setting of Departmental priorities. However sometimes this guidance may conflict — for instance objectives for improving urban air quality must be reconciled with concerns about global warming. We believe there would be value is bringing this guidance together through an **Air Quality Management Advisory Group**. This would advise on the most appropriate balance between local, regional and national measures, and the balance between regulation fiscal measures and voluntary action.

Co-operation and co-ordination could also be fostered or required in this type of structure through agreement or obligation for joint action as is the case in the US where, for example legislation places an obligation on the Secretary for Transportation and the administrator of the Environmental Protection Agency to report jointly at 3-yearly intervals to the President of the Senate on actions which they have taken on transport-related air pollution. The UK sustainability strategy and White Paper review process provides a framework for the identification of specific targets and reporting on progress. Attainment of the targets identified for air quality should become a key indicator of progress towards sustainable development.

5. Conclusions

The Society's own work in championing a rational approach to air quality management shows that locally led strategies are likely to form the most effective basis for action. However these need to be set in a matrix which empowers regional co-operation, and a quality assessment regime based on national criteria and standards. We believe this framework would be an ideal model for the forthcoming Air Quality Management Framework Directive. National oversight should ensure that strategies are consistent with broader objectives of sustainable development, but local action, properly resourced and targeted, is best placed to deliver clean air. Such action would also provide a basis for meeting regional and international obligations, and demonstrate UK leadership in promoting practical action for cleaner air.

VEHICLE EMISSIONS AND AIR QUALITY

The health case against particulate pollution seems to be strengthening, but delegates to a seminar organised by NSCA and Middlesex University in March heard doubts about the contribution which diesel cars are making to total UK particulate emissions.

New evidence from the US linking particulate pollution and health effects was presented by Dr. Sarah Walters of Birmingham University. Applying the US data to the UK has led some scientists to calculate that particulate pollution may be causing up to 10,000 deaths annually. One suggestion is that the particles which penetrate the lung are attacked by the body as bacteria, causing inflammation. Research has focussed on PM10 – particles below 10 microns – but Dr. Walters believes that even smaller particles below 2.5 microns may be the main problem, and this could have implications for future local authority air pollution monitoring. She acknowledged that research was still at an early stage and many uncertainties remained.

QUARG Chairman Prof Roy Harrison repeated his warning that a major penetration of the car fleet by diesels would put at risk future reductions in particulate emissions, which are expected as a result of improving car emission standards and the phase-out of leaded petrol. However he refused to be drawn on the number of deaths which might be attributed to PM10 in the UK.

If particulate pollution is an up-and-coming environmental concern, diesel engine manufacturers will have to meet the challenge with better technology, said John May of

Rover. He identified improvements in electronic controls, high-pressure injectors and oxidation catalysts as priorities. Although particulate traps are now available for large diesels they are unlikely to be viable for light-duty vehicles, he said. His view was supported by Frank Palmer of BP who emphasised that fuel composition had a much smaller influence on overall pollution emissions than variations in engine technology.

Several delegates from the motor industry challenged assumptions about the relative advantages of diesel and petrol cars. It was suggested that because of their inherent reliability, diesels continue to meet their designed emission standards throughout their life. By contrast the performance of petrol catalysts tends to deteriorate over the lifetime of a car, and catalysts often fail totally. Catalyst cars also perform particularly badly during cold weather starts. DOE bases its future emission projections on the assumption that only 5% of catalysts are malfunctioning at any one time, but experience in other countries suggests that the figure may be as high as one third.

Meanwhile a report commissioned by the DOT and DTI from the Energy Technnology Support Unit will attempt to evaluate the environmental pros and cons of diesel and petrol. It will take into account the full lifecycle of both fuels, including energy use at the refinery, local air pollution and global warming issues. Expected during the summer, it should provide yet another chapter in the diesel-petrol debate.

VEHICLE EMISSIONS
NSCA ROUNDTABLE

NSCA is concerned that a small proportion of "grossly polluting" motor vehicles are responsible for a significant proportion of total vehicle emissions. Many local authorities with an interest in air quality management have started voluntary "spotting" campaigns to identify and report smoking diesel vehicles. The technology to identify vehicles producing excessive amounts of invisible pollutants (such as carbon monoxide) has been demonstrated in the UK by the RAC[1].

Some local authorities are now showing an interest in developing their role in vehicle emission enforcement, using such techniques. Other candidates for an enforcement role are the police, the Vehicle Inspectorate, and the Environment Agency (SEPA in Scotland). Whilst there appears to be consensus that enforcement is important, no agreement has been reached on the most appropriate regulatory framework.

In June the Society convened a roundtable meeting, kindly hosted by the RAC, to discuss the question of vehicle emission enforcement policy. A summary of the points raised follows.

1. Performance of the current vehicle fleet

There is widespread public concern about air pollution linked with vehicles; this concern also extends to stationary vehicles and other mobile pollution sources on the highway. There is uncertainty about the relationship between air pollution and health, but the frequency of exceedance of air quality guidelines and standards as well as levels of public concern justify precaution.

About 20% of light duty vehicles do not meet MoT emission standards on the basis of random kerbside testing. The relationship between emissions detected during the MoT test when the engine is idle and in service (i.e. whilst driving) is uncertain. Simulated in service emission tests on a random sample of light duty vehicles indicated that the air quality benefits of speedy identification and rectification of gross emitters may be less than has been claimed.

Ninety-five per cent of non-compliant vehicles can be rectified in less than five minutes. Non-compliant vehicles have been found very shortly after a test certificate has been issued. Most vehicles remain in tune for a considerable period after maintenance.

There is public concern about "nuisance" emissions – smoke, odour and noise. Reporting schemes may have a part to play in identifying gross polluters.

2. Remote sensing

There is little correlation between the measurements obtained from remote sensing technology such as the FEAT (Fuel Efficiency Automobile Test[1]) detection system, and MoT test measurements. However FEAT should be able to differentiate between vehicles where a catalyst is working and those where the system has failed.

3. Modernisation of the vehicle fleet and improvement of fuels

The equipping of new vehicles with three way catalytic converters since 1992 will lead to significant reductions in CO, HC and NOx emissions as these vehicles contribute proportionately more per vehicle distance travelled. Vehicle tuning diagnosis and rectification is becoming increasingly dependent on sophisticated, computerised equipment which is not accessible to the non-franchised dealer.

The effectiveness of abatement systems in vehicles conforming to current regulations is limited by:

- long catalyst warm up times;
- episodes where the fuel management system overwhelms the catalyst;
- undetected equipment failure.

Technical developments including on board diagnostics (OBD) and rapid light catalysts, coupled with more realistic test regimes, and backed by new regulations already in the pipeline should address these problems for vehicles entering service after 1997/8. EPEFE, the European auto oil research programme, will provide a basis for regulations which optimise engine and fuelling specifications but the scope for further technological improvement is limited.

4. Enforcement issues

Non-compliant vehicles can be subject to a prohibition notice under VCU regulations, and it is an offence under the RTA to drive such a vehicle on public roads. Only a police officer in uniform has powers to stop a moving vehicle on a public road.

Police activity is increasingly focussed on Home Office targets for crime reduction. Whilst forces are sympathetic to support for health protection measures, their prime objective is to meet performance measures related to official targets. Experience with collaborative exercises shows that police co-operation with vehicle emission testing facilitates identification of other vehicle defect offences. Local authorities already have experience in encouraging the reporting of smoky diesels.

5. The way ahead

For most urban areas motor vehicles will continue to represent the major source of air pollution. QUARG has stated that reliance on penetration of catalysts will not be enough to achieve air quality standards. As plans for air quality management progress there will be increasing emphasis on the need to identify cost-effective methods of controlling vehicle emissions.

In the long term, a high proportion of the vehicle fleet should be fitted with an engine management/emission abatement system which is effective under all driving conditions and equipped with OBD. It would be a simple matter to include a data logger and to make it an offence to drive a defective vehicle. The Society should support rapid progress to this end.

In the short and medium terms many people will have legitimate concerns about vehicle related air pollution and nuisance. To meet these concerns NSCA should support:

- a definitive assessment of:

  (a) the likely contribution of gross emitters to UK air quality problems;
  (b) the technology available to detect them; and
  (c) the optimum balance of enforcement options.

  Such an assessment should be jointly sponsored by DOE, DOT and the Home Office who have a particular interest in questions (a) (b) and (c) respectively;
- demonstration of the practical benefits of kerbside identification of poorly maintained vehicles;
- recognition that vehicle standards enforcement is a legitimate, if low priority, concern for the police, and may be assisted by collaboration with local authority pollution control officers;
- evaluation of enforcement options for spotting smoky or noisy vehicles using visual or low-technology assessment;
- smoke-spotting initiatives where local authority pollution control officers spot smoky vehicles and report them using existing arrangements with DOT area offices;
- promotion of the idea that it is irresponsible and expensive to drive an out of tune vehicle;

- an effective system of quality control for the MoT test;
- further research into real world emissions from individual vehicles and the relationship with FEAT measurements;
- research into the health effects of vehicle related pollutants and the effects of vehicle type, condition and driving behaviour and fuelling on emissions, provided that waiting for the results of such research is not used as justification for a reduced level of precaution;
- evaluation of remote sensing techniques as a measure to detect failure of catalysts in advance of widespread and tamper-proof OBD.

1. FEAT: Remote Sensing of Vehicle Emissions, Dr. C.D. Holman. *Clean Air*, Vol. 21 No. 1, Spring 1991.

REDUCING EMISSIONS OF HAZARDOUS CHEMICALS TO THE ENVIRONMENT

Department of the Environment, Discussion Paper
February 1994

This discussion paper takes forward an undertaking in the Government's Sustainable Development Strategy to identify and control hazardous chemicals, reducing both point source and diffuse emissions. The aim is to develop a strategy which will be transparent to all concerned, particularly industry, enabling them to be proactive in the management of chemical risks. A hierarchy of control measures is identified including alternatives to regulatory control such as voluntary agreements with industry and economic instruments.

NSCA Comments

Introduction

We welcome the publication of this discussion paper as a first step in developing a coherent approach to the reduction of hazardous emissions. The paper takes a broad sweep of the subject, but sets the framework for further detailed work. We believe the major issues requiring clarification are:

— setting risk-based priorities for targeting chemicals
— identifying the best mix of mechanisms for taking action.

Identifying Chemicals of Concern

Although we welcome the emphasis on diffuse sources, the paper is vague on the classes of chemical it aims to address. The focus appears to be on chemical products or components of products. Many environmentally hazardous air pollutants are products of combustion, and it is not clear whether they would be included in the current analysis. Nor is it clear whether radioactive substances would be included. If the aim is to develop a rational control framework based on cost-effective risk minimisation then a wider interpretation of "environmentally hazardous substances", and a clear protocol for their identification, will be necessary.

This narrow view is reflected in the proposed criteria for concern. This should not be limited to "high tonnage" chemicals; trace toxic compounds also warrant attention. Bioaccumulation is a matter of concern in all ecological systems, not only in respect of fatty tissue and specific organs. No account is taken of synergistic effects; some air pollutants are of concern because of the products of secondary reactions with other pollutants.

The question of persistence in the environment will also require further interpretation. For substances such as heavy metals the total mass or concentrations in environmental media may not be as important as the degree of biological availability. Where substances occur naturally — for instance arsenic — the effect of pollutant dispersion will need to be judged in the context of natural background concentrations.

Risk Assessment

We believe that in theory risk assessment offers the best route to setting priorities for action, but that the practical difficulties are considerable. For many suspect substances, a lack of scientific data renders quantitative risk assessment techniques inappropriate. Complete lifecycle risk assessments will not be available for most of the thousands of compounds likely to be of potential concern.

In this respect we welcome the reiteration of commitment to the precautionary principle, but note that the current definition of Government policy appears to be logically flawed. The Government states its willingness to take precautionary action *"...even where the scientific knowledge is not conclusive, if the balance of likely costs and benefits justifies it".* Where scientific knowledge is inconclusive any assessment of likely costs and benefits will be subject to large errors and any attempt at "balance" will be misleading. In such circumstances the principle is to err on the side of caution, in proportion to the uncertainty of any risk and the potential magnitude of its impact.

Reducing Emissions

We agree in outline with the hierarchy of control proposed. However we do not believe that a presumption in favour of economic instruments will necessarily deliver environmental improvement more cost-effectively than regulation. Even in the quoted example of lead in petrol, the most significant improvement in air quality was produced by a regulation reducing the level of lead in petrol. The subsequent introduction of differentials in petrol tax, though welcome, has had a less pronounced effect. The relative effectiveness of economic instruments and regulation must be judged on a case by case basis; we believe that the scope for economic instruments may prove to be limited.

Voluntary agreements have been shown to be effective and a mechanism for brokering agreements could enhance the potential — again, there is a possible role for the Environment Agencies here. However, the Society believes that in many circumstances the existence of clear regulations, effectively enforced, will offer the most efficient and transparent means of control. The Society's industrial members have often made the case for strong regulation as essential underpinning for a level playing field and we believe this is likely to remain the case. The Government's current obsession with deregulation can only distort the objective of securing environmental objectives whilst maximising benefits to the economy and society.

Whilst the Chemical Release Inventory, Ecolabelling Scheme and Eco-Management and Audit Scheme all offer the prospect of emissions reductions, they cannot be relied upon as part of a wider plan to achieve predetermined levels of environmental improvement. Improvements will be fortuitous and unpredictable. There are also serious gaps in coverage. For example the CRI applies only to processes regulated by HMIP even though there can be significant releases from processes regulated by local authorities. A large number of smaller point source VOC emitters also escape local authority control.

The current patchwork of control covering emissions from point and diffuse sources contains many loopholes and overlaps. No mechanism exists to set overall priorities for emission reductions and identify new targets for action, based on an assessment of risk to human health and the environment. The proposed Environment Agencies offer the possibility of creating just such a coherent framework, identifying the most appropriate mix of measures likely to protect health and the environment at minimum cost to society and the economy.

PAYING FOR OUR PAST

Department of the Environment / Welsh Office
Consultation Paper, March 1994

Section 143 of the *Environmental Protection Act 1990* provides for the establishment by local authorities of public registers of land in their area which has been, or is being, put to contaminative use. This is defined as "any use of land which may cause it to be contaminated with noxious substances".

Following 1991 and 1992 consultations, the Government announced in March 1993 that it would not be introducing regulations setting up registers of contaminative land uses. It was felt that such a register could have an adverse affect on the value of the land "without giving any clear indication how such sites could be brought back into good condition and confidence restored". Instead a review committee was asked to look at public authorities' current powers and duties for cleaning up land and their applicability to contaminated land.

To that end, *Paying for our Past* sets out the policy, legal and factual background, identifies the key issues and the Review Committee's preliminary conclusions about them, and poses a set of questions relating to those conclusions. The Review Committee will then make recommendations to Ministers taking account of the responses to this consultation paper.

A separate review and consultation process is taking place in Scotland.

NSCA Comments

The Society's generic approach to environmental protection is based on the identification of scientifically based standards for the protection of human health and the wider environment, coupled with action to attain and maintain such standards in the most cost-effective and socially acceptable manner. Such an approach is straightforward in relation to the unowned media of air and water, but the case of land contamination is complicated by issues of ownership and liability.

We believe that the framework for control starts at European level. The Government believes the subject inappropriate for EC action on the basis of subsidiarity. However an inconsistent approach could mean some member states imposing large insurance or compensation fund obligations on industries, leading to competitive disadvantage. The likelihood of market distortion dictates that this is very clearly an appropriate matter for EC consideration.

The financial implications of the EC Green Paper on remedying environmental damage are uncertain but potentially very large, and the implications for statutory regulation unclear. Agreeing the detail of an EC-wide framework for civil liability will inevitably take time but we consider that steps should be taken in the short term to secure agreement on which of the wide range of options identified in the EC proposals can be ruled out and which can be ruled in for further discussion. This should at least narrow the limits of uncertainty and set the agenda for future negotiations.

It is in this context that we offer comments on the need for a national strategy for dealing with land contamination. Specific comments relate to the issues identified in the consultation paper.

What should the objectives be within the policy?

Standards for remediation are an essential ingredient in setting policy priorities. The definition of what constitutes *". . .unacceptable actual or suspected risks to health or the environment. . ."* must be quantified on the basis of risk assessment. We support the "suitability for use" approach, but it can only be applied consistently in the context of nationally agreed definitive guidelines. There will also be many circumstances when, irrespective of prospective land use, action must be taken to protect health or the environment. We welcome robust affirmation of the need to facilitate urgent action, but a "shoot first and ask questions later" approach demands greater clarity of regulatory boundaries and a willingness to provide the resources necessary for action. We would also suggest that alongside the requirement to *"minimise financial and regulatory burdens"* there should be a further objective to *maximise social and environmental benefits* from contaminated land.

How should the statutory framework meet the objectives?

As noted in the consultation paper, the creation of the Environment Agency (and SEPA in Scotland) will allow some rationalisation of regulatory powers. A further aim of the Agency should be to develop guidelines on interpretation of "environmental damage", set consistent standards for remediation, and assess the extent of the problem in the UK. Consolidation of a national framework for enforcement which assists local authorities in targeting and setting priorities for action should, we believe, be an important task for the Environment Agency.

On the question of financial liability, there may be a case for making special provisions for homeowners faced with a problem of land contamination; normal house purchase procedures are unlikely to uncover land contamination problems. In the interests of environmental protection statutory authorities, aggrieved individuals and public interest groups should all be allowed to seek remediation or compensation, including for damage to the unowned environment.

Should there be any extension of strict liability?

We believe that the implication of the polluter pays principle is that liability follows responsibility, whether or not fault can be proven. This would encourage industry, plus insurers and lenders, to uphold standards of environmental management. There should thus be a presumption in favour of strict liability in future to act as incentive to environmental responsibility. However limited "Act of God" defences should be available.

It can be difficult to attribute historical responsibility for land contamination. The line of strict liability should be drawn now; it is less easy to make a case for strict liability retrospectively if it can be shown that polluters were acting in good faith at the time. Thus any retrospective action should be fault-based.

Who should pay for putting right environmental damage?

The logic of the polluter pays principle dictates that the person or persons who caused the pollution should primarily be held liable, but where costs cannot be recovered the persons who currently "own" the pollution – landowners, and the financial institutions who underwrite them – should be the second means of redress. The final line of defence in dealing with orphan sites must be a cleanup fund. We consider that there is need for a joint compensation fund for remedying historical damage where liability cannot be established or attributed. In the UK this should be administered by the Environment Agency and SEPA, enabling them to make a balanced judgement on which enforcement strategies are likely to prove most cost-effective.

How should markets be provided with information?

The Society's response to the DOE/WO 1991 registers proposals supported the principle of a public register of contaminated land. The current consultation on revisions to form CON 29 (land charges conveyancing information) includes a question on landfill and contamination; information from conveyancing should be one element on the wider compilation of contaminated land registers.

What other roles should public sector bodies have?

As noted above, we believe that a further policy objective should be to maximise social and environmental benefits from contaminated land, and that the Environment Agency should take national strategic responsibility for dealing with contaminated land.

OZONE

NSCA warmly welcomed the 50 ppb air quality standard for ozone recommended by the Expert Panel on Air Quality Standards*, but pointed out that the standard is likely to be exceeded in many parts of the UK.

The choice of an eight hour averaging time gives a more realistic measurement of exposure and is consistent with World Health Organisation Guidelines. But it does mean that Government advice and air quality bandings — based on one-hour guidelines — are now out of step with the new standard.

NSCA said that the Government must act fast to revise the banding system and its advice to the public; this should be reflected in helpline information and guidance given to doctors. NSCA is concerned, however, that the current UK programme for reducing the precursors of ozone will almost certainly be insufficient to achieve the new standard. This gives new impetus to the need for effective measures to reduce vehicle pollution and other sources of the ozone precursors, NOx and VOCs.

*Expert Panel on Air Quality Standards, Ozone, £5.95, HMSO, 1994.

UPGRADING PLANS FOR PART B PROCESSES

Agreeing upgrading plans for Part B processes could be an even tougher challenge for local authorities than authorising the initial EPA applications, delegates to NSCA's training seminar held in Birmingham in early June were told. Consultant Bill Bell of TBV Science said that much of the potential of the EPA lay in its requirements to upgrade existing plant to agreed deadlines, but he had yet to see an upgrading plan worthy of the name. Industrial representatives from the foundry, minerals and woodworking sector admitted that progress on upgrading was likely to be slow, and complained of the economic impact and inconsistent application of standards. Much of industry was unprepared, but a guide on upgrading to BATNEEC produced by Sheffield City Council for local industry received the endorsement of DOE's Chris Megainey as a useful model for other authorities to follow.

At the same meeting Simon Smith of the DOE Local Authority Unit launched the new amendments to SI 472 — the Prescribed Processes and Substances Regulations. He said the net result would be more power over polluting processes, representing a vote of confidence in local authorities. His announcement that the programme of revising process guidance notes would now be stepped up drew a plea from industry representatives for wide consultation and realistic deadlines in meeting any new standards.

NSCA's latest training seminar attracted 300 delegates mainly from local authorities; as well as reviewing experiences on upgrading plans, speakers appraised methods for assessing and minimising the impact of industrial emissions on air quality and for demonstrating compliance with emission limits. NSCA is planning a further programme of training seminars, possibly regionally based.

NSCA's next major event will be its annual conference, Environment Protection 94, to be held in Blackpool. For a copy of the brochure, ring NSCA at 0273 326313.

NEWS FROM NSCA DIVISIONS

South East Division

The 39th AGM of the Division was held on 24 May 1994 at the Head Office of the British Coal Corporation. Paul Cooney (London Borough of Greenwich) was re-elected Chairman, F. John Smith was re-elected Deputy Chairman, Joe Beagle was re-elected Honorary Secretary, and Mr. B. Nagle Honorary Auditor.

Paul Cooney gave an account of the work of the Air Quality Monitoring Network in London and the South East, and stressed the importance of the cooperation between local authorities, regional health authorities, educational authorities, government departments and industry in collating data to assist in determining the cause and effect of air pollution on health especially respiratory illness.

After the AGM Mr. Peter Mudie, Regional Programme Director of Business in the Environment gave a very informative and interesting talk on how business and trade organisations are being made aware of environmental issues, and how they could best organise themselves regionally to meet the demands of government legislation and improve the quality of life for the community at large. Through organisations like BiE expertise is available in all the disciplines for Smaller and Medium Companies to achieve, through cooperation with bodies like the NSCA, competitive advantage and financial gain by measures calculated to improve the environment.

North West Division

The State of The Environment

Thursday 26 May 1994 saw a packed Town Hall at Ashton-Under-Lyne to hear NSCA's President, Lord Lewis of Newnham, with supporting speakers from local authority and industry give their views on the State of the Environment in their own areas of work. Over two hundred people from industry, commerce, local authorities (councillors and officers) together with students from schools, colleges and universities were treated to a wide spectrum of factual information embracing policy, performance, production and pollution.

Lord Lewis spoke about the "riches that sustainable consciousness could afford to our 'world' if we cared to assess what we do on a personal level" which brought home the responsibility that each of us has for the planet. He touched on the many facets of his experience — and as was heard several times from the audience — "in a way in which each one of us could understand at whatever level of our knowledge".

Derek Taylor from Lancashire County Council gave a thorough overview of their environmental programme and their assessment of sustainability; he quoted from the Lancashire Environmental Action Plan covering planning, development, transport and pollution; he said that the process was arduous and sometimes impossible but the production of the original report had been a springboard for funding initiatives, a source of reference for other local authorities and a building block for the future of Lancashire's environmental strategy. All authorities within the county are members; all subscribe to the initiatives and through a forum, of which the NSCA NW Division is a member, decisions are made.

Phil Roberts, Group Environmental Manager for ICI Chemicals and Polymers, was eager to indicate the cleaner side of its industrial processes by drawing on and describing archive material and comparing it to today's industry-scape viewed against a clear sky. It was evident that ICI Board members were committed to environmental audit and the philosophy of BS 7750. He described the environmental measures that ICI had taken particularly with regard to waste minimisation and the savings made.

Just over 50 delegates stayed for lunch which provided a continuing forum for debate, exchange of ideas and further new memberships forged for the Society.

NSCA Chairman, Geoff Kaufman, had the last word in summing up the proceedings by saying that the day "appeared to have been a success" — feedback from delegates would suggest that this was an understatement which must be good for the Society.

NSCA ENVIRONMENTAL REVIEW

NSCA has recently reviewed the environmental impact of its activities to ensure that pollution and resource use is minimised wherever possible. The main reasons for undertaking the review were first, to identify some measures which might result in environmental improvement and/or produce cost savings; second, our stakeholders are beginning to request the information (and indeed a copy of our review has been sent to the Department of the Environment); and third, as an environmental group, we must practise what we preach.

Staff were consulted on the review and invited to submit views on the main impacts, possible changes or improvements, responsibility for making any changes and monitoring and measuring effectiveness. As the result of feedback, the following priorities were identified.

- **Energy Use:** The building is badly insulated and internal temperature fluctuates widely. While some management measures could reduce energy use, most would require investment by our landlord. Thus with immediate effect more care will be taken to switch off lights and office machines when not in use and to use the stairs instead of the lift. For the future, the upgrading of the insulation/heating control system will be discussed with the landlord and gas and electricity meter readings monitored.
- **Paper:** Competing claims for environmental acceptability of paper are difficult to resolve; the process should eventually be assisted by ecolabelling. Books and journals are printed on a mix of 45% woodfree unprinted waste/45% woodfree printed waste/10% virgin fibre. Most envelopes are made from recycled paper. Photocopy paper is sourced from forests which comply with Helsinki Principles. Recycling our own waste paper is now not economic because the influx of waste paper from Germany has reduced prices. We recycle most paper and board packaging as parcel wrapping. Producing printed information is one of the Society's

major activities and it is not therefore appropriate to set targets for reducing paper use. However the introduction of desktop publishing combined with double-siding photocopies and letters should result in more efficient use of paper without sacrificing readability.

For the future the environmental claims etc for paper and recycling options will be kept under review. Mailshot databases will also be reviewed to ensure brochures etc are reaching useful targets, and ways of streamlining papers sent to Council and committees will be considered.

- **Inks and solvents:** Our printing department uses a range of inks and solvents with low emission products being used where effective; printer cartridges are recycled. The proposed health and safety audit may make recommendations on solvents.
- **Transport:** Most staff commute by bicycle or public transport and public transport is used for staff work journeys wherever practicable.

  A large number of trips are generated by delegates attending workshops and conferences; thus more attention should be paid to ensuring that venues are easily accessible by public transport and transfers to nearest BR stations should be facilitated. In future public transport links will be emphasised in brochures.
- **Housekeeping, general purchasing:** Main purchases are office supplies (stationery, equipment) and housekeeping (food and drink, cleaning products). A wide range of cleaning products are used in the office. Efforts should be made to reduce use of volatile/perfumed products and to use environmentally "friendly" alternatives if claims appear to be justified and products are comparable in effectiveness and cost; some kitchen waste could be reduced or recycled.

Following this review, progress will be evaluated in May 1995. In the light of experience, further thought will be given to the establishment of indicators and targets by which improvements might be measured. We accept the need to monitor resource use in relation to unit activity. This is not possible at present but will be kept under review.

Copies of the full review are available from Sally May at NSCA.

NSCA POLICY STATEMENTS AND REPLIES TO CONSULTATION DOCUMENTS
April-June 1994

Paying For Our Past – Contaminated Land Policy, DOE. (See this issue of *Clean Air.*)

Reducing Emissions of Hazardous Chemicals to the Environment, DOE. (See this issue of *Clean Air.*)

Transport-related Air Pollution in London; Inquiry by the House of Commons Transport Committee (Response dated 7 June.)

UK Round Table on Sustainable Development, DOE. (Response dated 15 June.)

Improving Air Quality, DOE, (See this issue of *Clean Air.*)

REPORTS

SMOKE CONTROL PROGRAMMES 1993/94

During 1993/94 grants totalling £2.1 million were awarded to 30 local authorities. There are currently 30 local authorities completing smoke control programmes, and a large number who have either suspended programmes or delayed setting a target. This implies that there is still a great deal of work to be done, but as Government grants towards the costs of implementing smoke control are to be discontinued from 1995, there is little chance of completion for some areas.

Smoke Control Areas

The following table lists the local authorities in the United Kingdom who currently enforce smoke control. The information has been compiled directly from returns from local authorities. It can be assumed that any authority not listed does not have a smoke control programme.

The table shows the target date for completion of the smoke control programme; the final area to be covered in hectares; the percentage area of the authority currently covered by smoke control and the number of premises currently covered by smoke control orders. It should be noted that some areas cover large rural districts, so that although the percentage area covered may be low, the proportion of premises covered is high. The figures are for the position on 31 March 1994.

British Isles divisions, issued by the Department of the Environment are listed below:

East Anglia	Norfolk, Suffolk.
East Midlands	Derbyshire, Leicestershire, Lincolnshire.
Greater London	
North West	Cheshire, Greater Manchester, Lancashire, Merseyside.
Northern	Cleveland, Cumbria, Durham, Northumberland, Tyne and Wear.
Northern Ireland	
Scotland	
South East	Bedfordshire, Berkshire, Buckinghamshire, East Sussex, Essex, Hampshire, Hertfordshire, Kent, Oxfordshire, Surrey, West Sussex.
South West	Avon, Cornwall, Devon, Dorset, Gloucestershire, Somerset, Wiltshire.
Wales	Clwyd, Dyfed, Gwent, Gwynedd, Mid Glamorgan.
West Midlands	Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.
Yorkshire and Humberside	Humberside, North Yorkshire, South Yorkshire, West Yorkshire.

Key

Comp	— completed
n/k	— not known
susp	— suspended
clld	— programme cancelled
x	— no return received this year, previously returned figures used.

Authority	Target date		Final area to be covered	% of LA area covered	No of premises
EAST ANGLIA					
Cambridge CC	Susp		n/k	14	n/k
Kings Lynn & W N BC	n/k		n/k	0.2	4474
Norwich CC	Susp		3907	16	3590
Peterborough CC	n/k	x	n/k	8.3	34126
EAST MIDLANDS					
Amber Valley BC	n/k		19300	6	8519
Ashfield CC	Comp	1992	11010	100	48084
Bassetlaw DC	1993		7524	12	31980
Blaby DC	Comp	x	n/k	29	20244
Bolsover DC	1993		16138	100	32501
Broxtowe BC	Comp		6017	75	37056
Chesterfield BC	Comp	1991	6611	100	42711
Corby DC	Comp	x	1029	13	11860
Derby CC	Comp	1986 x	19282	100	90233
Erewash BC	1992		2005	18	21462
Gedling BC	1994		2774	23	41600
High Peak BC	Comp	1986	1666	3	14148
Leicester CC	Comp		7342	100	126046
Lincoln CC	Comp	1989	3571	100	41700
Mansfield DC	1993		7692	100	46239
N E Derbyshire DC	n/k		68484	30	30406
Newark & Sherwood DC	Comp	1991	3153	4	11702
North Kesteven DC	Comp		121	0.13	983
Northampton BC	Comp		n/k	40	22800
Nottingham CC	Comp	1991	7432	100	134085
Oadby & Wigston BC	n/k	x	n/k	6	903
Rushcliffe BC	Comp	1983	1308	3	11569
South Kesteven DC	Comp		1550	2	16050
West Lindsey DC	Comp	1990	28	0.02	1
GREATER LONDON					
Barking & Dagenham	Comp	1985	8886	100	70118
Barnet LB	Comp		n/k	99	134329
Bexley LB	Comp		2603	100	89886
Brent LB	Comp	1984 x	4421	100	109245
Bromley LB	Comp	1979	29600	79	137000
Camden LB	Comp	1968	5365	100	88214
Corp. of London	Comp		N/A	100	12902
Croydon LB	Susp		21395	62	106000
Ealing LB	Comp		5550	100	118738
Enfield LB	Comp	1973	8118	100	110000
Greenwich LB	Comp	1972	4744	100	94705
Hackney LB	Comp	x	4814	100	n/k
Hammersmith LB	Comp	1967 x	3988	100	73000
Haringey LB	Comp		3031	100	93000

Authority	**Target date**		**Final area to be covered**	**% of LA area covered**	**No of premises**
Harrow LB	Comp	1975	n/k	100	All
Havering LB	Comp	1979	12000	100	90000
Hillingdon LB	Comp	1980	10877958	100	96000
Hounslow LB	Comp	1972	14460	100	89614
Islington LB	Comp	1969	9091	100	65000
Kensington & Chelsea	Comp	x	2950	100	25288
Kingston on Thames LB	Comp	1980	1496	100	55738
Lambeth LB	Comp	1977	2724	100	116000
Merton LB	Comp	1977	3796	100	All
Newham LB	n/k		3637	100	All
Redbridge LB	Comp	1974	5650	100	78000
Richmond LB	Comp	x	12866	100	88914
Southwark LB	Comp	1988	n/k	100	97000
Sutton LB	Comp		10732	100	67730
Tower Hamlets LB	Comp	x	1973	100	n/k
Waltham Forest LB	Comp	1985	3967	100	90000
Wandsworth LB	Comp	1980 x	8861	100	121000
Westminster LB	Comp	1970	2120	100	116300
NORTH WEST					
Blackburn BC	Comp	1986	5278	38	48271
Bolton MBC	Comp		34572	100	105077
Burnley BC	Comp	1980	23700	82	42050
Bury MBC	1994		9917	79	58292
Chorley BC	n/k		1622	2	3186
Crewe & Nantwich BC	Comp	1993 x	994	2	12214
Ellesmere Port BC	Comp	1982 x	1577	21	23114
Halton BC	Susp	x	n/k	90	39933
Hyndburn BC	Comp	1980	16611	92	37976
Knowsley MBC	Susp		2580	23	20837
Lancaster CC	n/k	x	n/k	6	9478
Macclesfield BC	Comp		123	0.2	2635
Manchester CC	Comp	1985 x	11624	100	214000
Oldham MBC	1993	x	21361	61	102788
Pendle BC	Comp		14964	36	29500
Preston BC	Comp	1985	8347	26	48675
Ribble Valley BC	Comp	x	870	1	890
Rochdale MBC	Comp	1989	30724	70	78222
Rossendale BC	1991		12586	92	26816
Salford CC	Comp	1978	23942	100	90279
Sefton MBC	n/k	x	14742	6	2587
South Ribble BC	1994		11307	70	39427
St Helens MBC	1993		12327	95	69527
Stockport MBC	n/k		31147	79	116300
Tameside MBC	Comp	1980	10360	100	100711
Trafford MBC	n/k		n/k	100	106000
Vale Royal BC	n/k	x	2777	7	11236
Warrington BC	Comp	1979	16733	95	73400
West Lancashire DC	Susp	n/k	n/k	20	14236
Wigan MBC	n/k	x	n/k	56	73255
Wirral MBC	1995		13178	76	114211

Authority	Target date		Final area to be covered	% of LA area covered	No of premises
NORTHERN					
Allerdale DC	1995		125729	95	41596
Alnwick DC	n/k		n/k	0.004	76
Blyth Valley BC	1992		7000	100	31556
Carlisle CC	Susp		898	0.3	4200
Castle Morpeth BC	1997	x	2200	2	6155
Copeland BC	n/k	x	n/k	0.2	1671
Darlington BC	Comp	1987	6469	13	39916
Derwentside DC	n/k		n/k	0.69	3974
Easington DC	1993		3302	84	31571
Gateshead MBC	1992		14314	100	99000
Hartlepool BC	Comp	1982	3672	39	34520
Langbaurgh BC	1995		5858	23	52187
Middlesbrough BC	Comp	1979	4950	91	56000
Newcastle-on-Tyne MBC	n/k		11187	100	119923
North Tyneside MBC	Comp		8383	100	72000
Sedgefield DC	None		189	9	6000
South Derbyshire DC	n/k		695	2	5500
South Tyneside MBC	Comp		6100	93	68000
Stockton-on-Tees BC	Comp	x	16227	34	60000
Sunderland CC	1995		13958	n/k	73128
Wansbeck DC	1993		6630	100	29736
NORTHERN IRELAND					
Antrim BC	Comp	1976 x	740	100	7192
Ards BC	None		n/k	0.05	823
Armagh DC	n/k	x	n/k	5	96
Ballymena BC	Susp	x	n/k	0.9	890
Belfast CC	1996		7103	76	100335
Castlereagh BC	n/k		2646	33	20
Down DC	n/k		n/k	0.003	n/k
Larne BC	1998		964	0.46	290
Newry & Mourne DC	1997		270	0.0008	972
Newtonabbey DC	n/k	x	n/k	5	7084
North Down BC	n/k		176	5	1090
SCOTLAND					
Bearsden & Milngavie	n/k		n/k	95	14680
Clackmannan DC	n/k		39680	2	3900
Clydebank DC	Comp	1980	9330	100	19989
Cumbernauld & Kilsyth	n/k	x	n/k	1	2080
Cunninghame DC	1995		3860	1	6468
Dumbarton DC	2005		11787	6	16957
Dundee CC	n/k		23504	40	69778
Dunfermline DC	1995		774	3	5535
East Kilbride DC	Comp		5471	8	26790
Edinburgh DC	1995		23877	52	105000
Ettrick & Lauderdale	n/k		715	0.07	7002
Falkirk DC	1996		20000	24	43455
Glasgow CC	Comp	1992	20300	100	329497
Hamilton DC	n/k		n/k	13	16844
Inverclyde DC	n/k		n/k	23	9290
Kilmarnock & Loudoun	n/k		41	<1	578

Authority	Target date		Final area to be covered	% of LA area covered	No of premises
Kirkcaldy DC	1996		2576.6	9.5	17300
Kyle & Carrick DC	Comp		243	0.04	156
Monklands DC	1995		40000	90	30500
Motherwell DC	n/k		n/k	2	6518
Nithsdale DC	None		4000	<1	7865
Perth & Kinross DC	n/k	x	0	0	40500
Renfrew DC	Clld		21986	29	71500
Roxburgh DC	n/k		n/k	12	1900
Stirling DC	n/k		153	<1	2050
Strathkelvin DC	n/k		160000	12	7000
West Lothian DC	n/k		2700	6	16000
SOUTH EAST					
Aylesbury Vale DC	Susp		3594	>1	5320
Basildon DC	n/k		n/k	16.5	21682
Bedford BC	Comp	1987	2200	4	36800
Bracknell Forest BC	Comp		3811	14	35000
Brentwood DC	n/k	x	n/k	40	2856
Brighton BC	Susp		596	10	24392
Broxbourne BC	Comp		n/k	100	32143
Canterbury CC	n/k		31246	0.34	2865
Crawley BC	n/k	x	11520	37.9	38243
Dacorum BC	Comp		1509	7	15000
Dartford BC	Comp		17267	n/k	31035
Elmbridge BC	Comp		0.4	n/k	50
Epping Forest DC	n/k		600	1.7	2463
Fareham BC	2000	x	7413	n/k	n/k
Gillingham BC	Comp		3240	100	37183
Gravesham BC	Comp	1985	1834	18	25278
Guildford BC	Susp		n/k	4	10517
Harlow DC	1994	x	2905	80	30000
Hertsmere DC	n/k		9397	10	7913
Luton BC	Comp	1979	4336	100	80000
Milton Keynes BC	Susp	x	3180	10	33300
North Herts DC	Comp		543	1.4	5000
Oxford CC	Susp	x	621	61	35000
Portsmouth CC	Susp		4027	17	19039
Reading BC	Susp	x	3995	62	45000
Rochester on Medway	n/k		n/k	16	19974
Sevenoaks DC	Comp	1969	553	1	7344
Slough BC	Comp	1988	2743	100	39796
South Buckingham	n/k		n/k	n/k	122
South Oxfordshire DC	n/k		n/k	0.3	400
Southampton CC	Comp	1981	1750	32.6	27551
Spelthorne BC	None		5617	85	31834
Stevenage BC	Comp	1982 x	n/k	98	n/k
Thurrock BC	None		n/k	22	22800
Watford BC	Comp	1979	2137	100	34550
Windsor & Maidenhead	Susp		336	6	2655
Wycombe DC	Comp		1546	5	21500
SOUTH WEST					
Bath CC	1994		n/k	100	33354
Bristol CC	Comp	1988	26516	100	155340

Authority	**Target date**		**Final area to be covered**	**% of LA area covered**	**No of premises**
Cheltenham BC	Susp		4680	35	16235
Exeter CC	n/k		11660	60	19000
Kingswood BC	n/k		n/k	0.1	130
Northavon DC	Comp	1990	2456	5	12885
WALES					
Alyn & Deeside DC	n/k		n/k	0.1	45
Delyn BC	n/k		1200	1.7	820
Newport BC	n/k		27	0.14	654
Swansea CC	Comp		249	<1	2710
Wrexham Maelor BC	Susp		11	2.4	10390
WEST MIDLANDS					
Birmingham CC	1996		n/k	n/k	n/k
Cannock Chase DC	1998		7800	7	10109
Coventry MBC	n/k		n/k	100	120000
Dudley MBC	Comp	1989	9794	100	155336
East Staffordshire	1995		4800	5	18000
Lichfield DC	1993/4		3574	11	21205
Newcastle U Lyme BC	1995		8109	81	38577
North Shropshire DC	Susp		530	0.3	1950
North Warwickshire	1992		4595	16	16764
Nuneaton & Bedworth	1994		6272	79	41062
Rugby BC	Comp	1979	7010	9	23301
Sandwell MBC	Susp		8559	31	34446
Shrewsbury & Atcham	n/k		n/k	0.7	3350
Solihull MBC	1993	x	5098	28.5	57618
South Staffs DC	Susp		6400	5	3066
Staffs Moorlands DC	1995		2071	3.5	17429
Stoke-on-Trent CC	1992		9287	100	104151
Tamworth BC	1995		1100	60	43877
Walsall MBC	n/k		10630	81	91000
Warwick DC	Comp		2737	10	36003
Wolverhampton MBC	None		6892	77	67775
Worcester CC	1992		481	100	32778
Wrekin DC	Susp		19311	13	19966
Wyre Forest DC	n/k		n/k	1.3	6867
YORKSHIRE & HUMBERSIDE					
Barnsley MBC	1995		32863	45	78158
Bradford MBC	n/k		91444	56	180106
Calderdale MBC	n/k		16443	45	83000
Chester Le Street DC	1995		2488	28	8062
Craven DC	Comp		3291	10	11000
Doncaster MBC	1994		56250	100	102
Glanford BC	n/k		58071	2	4986
Harrogate BC	Susp		530	1	21497
Hull CC	Comp	1992	7101	100	110781
Kirklees MBC	Comp		40910	100	172625
Leeds CC	Susp		56027	55	223463
Rotherham MBC	Comp		28280	100	111970
Ryedale DC	1995		910	0.48	11244
Scunthorpe BC	Comp	1981	3376	100	27200

Authority	Target date		Final area to be covered	% of LA area covered	No of premises
Selby DC	Comp	1990	3097	4.3	11285
Sheffield CC	Comp	1981	58048	64	222338
Wakefield MBC	1994		35120	100	140320
York CC	Comp	1991	2950	100	40000

INTERNATIONAL SYMPOSIUM NON-CO_2 GREENHOUSE GASES: WHY AND HOW TO CONTROL?

This international symposium was held from 13-15 December 1993 in Maastricht, The Netherlands, in support of the IPCC-process. It was organised under the auspices of the European Symposium on Environmental Protection (TESEP) and hosted by the Society for Clean Air in The Netherlands in cooperation with the European Commission, UN FAO, OECD, IGBP International Global Atmospheric Chemistry Project and Eurotrac. It was also held in cooperation with five fellow members of IUAPPA, including NSCA. NSCA was represented by Dr. Jimi Irwin (formerly at Warren Spring Laboratory, now at HMIP) and Dr. David Fowler, Institute of Terrestrial Ecology, Bangor.

Over 165 scientists, engineers and policy analysts from 29 countries, including developing countries, participated in the Symposium; the aim was to summarise current scientific understanding of the role of non-CO_2 greenhouse gases, focussing on why they should be controlled and options for doing so.

Reasons for Control

1. In 1992 the Framework Convention on Climate Change (FCCC) was signed in order to address the risks associated with climate change. Its main objective is the stabilisation of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. The Symposium focused on the role of the non-CO_2 compounds methane, nitrous oxide, halocarbons, tropospheric ozone and sulphur dioxide, and on mitigation options that will help achieve the Convention's objective.
2. Non-CO_2 greenhouse gases contribute now and are expected to contribute significantly in the future to the enhanced greenhouse effect. Through the atmospheric chemistry of these gases, the problems of climate change, tropospheric ozone build-up and stratospheric ozone depletion are intricately connected. The non-CO_2 greenhouse gases and their precursors also contribute to a variety of other environmental problems, including urban air pollution, photochemical smog, acid deposition, groundwater pollution and eutrophication.
3. The recent unexpected slow-down in the growth rate of concentrations of a number

of greenhouse gases shows how little we still know and how rapidly some of these gases respond to changes in emissions and atmospheric conditions. However, without additional policies, emissions of greenhouse gases are expected to grow by a factor of two or more in the next century, due to expected global economic growth and population increase. Under these circumstances, it is likely that the long-term growth of greenhouse gas concentrations will continue.

4. Tropospheric ozone is not emitted, it is formed in the atmosphere due to chemical reactions involving compounds such as NO_x, CO and VOCs, called ozone precursors. The role of tropospheric ozone in climate change is significant. Since the effect of precursor emissions and atmospheric chemical processes on tropospheric ozone levels depend on varying regional atmospheric conditions, it is difficult to predict future global changes in tropospheric ozone concentrations accurately. Both changes in the vertical temperature distribution associated with changes in the ozone profile and the regional distribution of tropospheric ozone are important for climate change.
5. The direct warming effects of CFCs and HCFCs (due to their radiative properties) cannot be simply compared to their indirect cooling effects (due to their depleting effects on the ozone concentration in the lower stratosphere). This is because the direct radiative effects of CFCs and HCFCs are distributed evenly over the globe while their indirect effects on global warming show regional differences in the depletion of the ozone layer, notably in the antarctic and arctic regions.
6. The Montreal Protocol has had a significant effect on the production of regulated CFCs and their atmospheric concentrations. However, CFC-replacements, such as HFCs, may become significant as greenhouse gases in the future.
7. Anthropogenic aerosol particles, in particular sulphates, originating from SO_2 emissions, at least partially offset the enhanced greenhouse effect in certain areas. As aerosol particles have a relatively short lifetime in the atmosphere, this effect is limited regionally and temporally. Emissions reductions, necessary to abate acid deposition, will quickly eliminate this offset.
8. In the FCCC, industrialised countries are requested to aim at returning their greenhouse gas emissions by 2000 to 1990 levels. Stabilisation of emissions represents a first step towards stabilisation of atmospheric concentrations.

How to Control

9. Most technological and other options to control carbon dioxide, such as increasing energy efficiency, alternatives to fossil fuels, and combating deforestation, also contribute to the reduction in emissions of many non-CO_2 greenhouse gases.
10. In addition, a wide variety of options is currently available to control the emissions of non-CO_2 greenhouse gases. Many of these options involve process improvements or emissions control devices, are relatively easy to implement and have other environmental and economic benefits, in addition to reducing interference with the climate system, Agricultural sources of non-CO_2 greenhouse gases are more difficult to control and would require long-term mitigation measures.

11. Despite uncertainties in source strength it is possible to rank different source categories according to their importance at the national level. Subsequently, governments can assess their own opportunities for emissions controls, taking into account least-cost options, environmental benefits and other impacts.
12. Implementation of options for the control of methane emissions, which are economically feasible, is likely to stabilise global methane emissions. Implementation of all options that are technologically feasible could probably at least stabilise atmospheric concentrations of methane.

Recommendations

13. Stabilisation of emissions of nitrous oxide in most industrialised countries appears to be feasible. However, this will not be enough to stabilise global nitrous oxide emissions and concentrations in the coming decades. Population increase and economic growth are likely to provoke an increase in N_2O emissions in developing countries.
14. Reduction measures for non-CO_2 greenhouse gases that could be implemented immediately, include: strongly reduce methane emissions from fossil fuel production, reduce landfilling of organic wastes and recover landfill gas, improve cattle nutrition in developing countries, control industrial N_2O emissions, improve fertiliser efficiency, and promote non-halocarbon substitutes for CFCs.
15. The Guidelines for preparing national inventories of greenhouse gas emissions as currently developed by the IPCC/OECD form an appropriate format for complying with the reporting requirements of the FCCC. The inclusion of several additional categories of gases, such as HFCs and PFCs, and of natural emissions is desirable.
16. To analyse the regional to global distributions of the concentrations of short-lived non-CO_2 greenhouse gases, notably the vertical profile of tropospheric ozone, the global monitoring system for these gases should be expanded. Currently, monitoring activities are biased towards the industrialised countries in the northern hemisphere. Measurement methods around the world should be harmonised to allow for global comparison. A coordinated effort is supported to establish a truly global system of observations.
17. The symposium identified the following research priorities:
    a) to quantify indirect global warming effects of chemically active trace gases;
    b) to analyse chemical, physical and biological processes determining the strength of the different sources;
    c) to analyse the interacting roles of the non-CO_2 greenhouse gases in climate change and in tropospheric and stratospheric ozone chemistry;
    d) further identification and optimisation of short and long-term control options in energy, industry, transport and agriculture;
    e) to quantify uncertainties in GHG emission estimates.

    This research should be carried out in reference to policy issues in order to enhance the dialogue between scientists and decision makers.

18. To apply Global Warming Potentials (GWPs) in integrating climate effects of non-CO_2 greenhouse gases, it is necessary to use best available science in quantifying atmospheric reactivity and radiative potential of these gases. To account fully for their important indirect radiative effects, quantitative assessment of such effects is necessary.
19. To ensure an effective participation of developing countries it is recommended that developed countries promote institutional support as part of capacity building. Notably, developing countries need further assistance to develop their own monitoring and assessment capabilities.

APPROACHES TO THE CALCULATION OF DISCHARGE STACK HEIGHTS FOR ODOUR CONTROL

D.J. Hall*, V. Kukadia*
Warren Spring Laboratory

Summary

The report reviews the present UK approaches to determining stack heights for odour control purposes. It then goes on to consider the associated problems in more detail and the options for improved methods both in the immediate and longer terms. It is part of a wider review of the problems of odour monitoring and control undertaken for the Department of the Environment and deals specifically with dispersion problems.

1. Introduction

Odour nuisance is one of the two major causes of environmental complaint, the other being dust and grit, since both are directly perceptible. The control of odour nuisance may be by a variety of means, mainly by modification or control of the process, abatement of the odorous material or its effective dispersion in the atmosphere from a discharge stack of adequate height. Though perfect control or abatement of odorous discharges is sometimes possible in principle, it is rare in practice. There are also many odorous discharges which, for a variety of reasons, are difficult or costly to reduce by treatment and for which effective dispersion is therefore a preferred option. In practice there is thus usually a balance to be struck between process control, abatement and dispersion in order to achieve effective control of odours.

The determination of discharge stack heights for effective dispersion is therefore an important feature of odour control. Unfortunately this importance has not been matched by a corresponding effort in finding reliable methods of determining these heights. At present there is no formally recommended method of calculating stack heights to deal with odorous discharges in the same way that, for example, the Memorandum on Chimney Heights (Dept. of the Environment, 1981) is issued for dealing with conventional combustion plant and the newer guidance (HMIP, 1993) for other polluting discharges. The nearest approach to this is the advice to be found in the Concise Guide to Odour Control (Valentin and North, 1980). This document covered all aspects of odour control, including the dispersion of odorous contaminants, as well as it was known at that time. The section on dispersion contains a brief review of conventional gaussian dispersion theory, a briefer explanation of the relationship between mean and fluctuating plume concentrations and a number of formulae for approximately estimating odour dispersion and chimney heights.

---

*Now at the Building Research Establishment

Useful though this advice is (particularly at the time of publication, when there was, effectively, no other advice at all), it is of limited value in practice. Though the principles of stack height determination for odours are explained, no systematic method of doing so, which accounts for the most important parameters and which can easily be used by the non-expert, is supplied. The formulae given are mainly helpful in trying to estimate ball-park values for the extent of odour problems and the order of stack heights that might be required for effective dispersion. Practical experience in using these formulae has had mixed success — they sometimes seem effective, but at other times have been seriously in error. These variations are probably due in part to both the approximate nature of the formulae and in part to their being used outside the range of their, approximate, validity. Also the sources of some of the formulae are uncertain, though it is sometimes possible to derive them from first principles. The Appendix gives an example of this which became the recent subject of a query.

There is no doubt that there is a need for a simple systematic method of calculating stack heights for odorous discharges. In producing the recent Guidelines on Discharge Stack Heights for Polluting Emissions (HMIP, 1993), the authors (also those of the present paper) deliberately omitted dealing with odorous emissions. The reason was that the additional problems posed by dealing with odour dispersion were not manageable within the confines of that programme. This omission produced more comment about the document than any other item. A suitable method of calculating stack heights for odours could readily follow the same sort of procedure as the new guidelines for toxic pollutants. It would require some means of determining the effective odour discharge and some acceptable limit threshold for the odour. The same procedure as previously could then be used to estimate the dispersion and calculate stack heights, accounting for different discharge conditions and building downwash effects. It is clearly possible in principle to use the existing guidance by using odour discharge and appropriate odour thresholds to calculate a Pollution Index instead of toxic pollutant discharges and appropriate guideline concentrations. However, there are a number of specific differences in the dispersion of odours and the response to them, compared with toxic discharges, which make such a simple approach uncertain. The present report deals with these differences and considers what needs to be done in order to produce a simple but effective method of calculating stack heights for odours. Amongst a number of matters requiring attention, there were two quite specific problems, which are discussed below.

The first is in the fundamental difference in approach required in comparison to the conventional gaussian model which is usually used for dispersion calculations. This is related to the fluctuations in concentration which occur naturally in dispersing plumes;

the matter is discussed in more detail in the next section. This problem was understood quite clearly when the Concise Guide was produced and attempts were made to account for it, but the subject was not well researched at that time and the advice that could be given was limited. A feature of research into dispersion in the last ten years, and especially the last five, has been the interest in this area and the substantial amount of work that has been carried out. Unfortunately, little or none of it is directly concerned with the calculation of stack heights, so it is not possible to make immediate use of it. However, it should provide a basis for an improved approach.

The second problem is related to the way individuals are exposed to odours as a result of the dispersion process and the psychology of their reaction to this form of exposure. Over short time scales, the unsteady character of the dispersion process gives rise to particular forms of exposure in terms of variations in both the level of exposure and its frequency of repetition. The way in which an individual may react to this exposure, especially those features which are critical to it, affects the way in which the dispersion of odours is assessed.

2. Dispersion and Odours

Conventional dispersion theory assumes that time-averaged plumes have a gaussian distribution of concentration across the wind. Figure 1, taken from the Concise Guide, is typical of illustrations of this conventional dispersion model. Estimates of the standard deviation of the vertical and horizontal gaussians are obtained from field measurements and other sources as a function of distance from the source, atmospheric stability etc. These values are then used to calculate plume dispersion under different conditions; the NRPB model (Clark 1979) is a good example of UK (and international) standard practice. This approach is by far the most widely used to deal with practical dispersion problems.

Unfortunately this approach is of limited assistance in dealing with the dispersion of odorous materials. Though this dispersion is identical to that of other passive (in a meteorological sense) contaminants, it is the very short time scales of the human response to odours, down to about one second, that distinguishes them from most other pollutants. Conventional polluting discharges of potentially harmful pollutants are normally at relatively low concentrations in the atmosphere and minimum exposure times of the order of five minutes are required to produce a response. Exposure times of interest range, for various reasons, between a few minutes and annual averages. The time-averaged gaussian plume model described above is quite appropriate for these time scales, which is why it is so widely used. With odours, the sensor, the human nose, is capable of responding time scales down to about one second and the time-averaged gaussian model is no longer appropriate. The reason for this is that atmospheric dispersion is a stochastic — that is an unsteady — process since it is driven by atmospheric turbulence, which is also stochastic. This means that any measured quantity, such as the concentration of some contaminant in a dispersing plume, will vary with the passage of time, but that the statistical properties of this varying quantity, such as the mean or the standard deviation, will be meaningful.

Some idea of what this means in practice can be seen from the visualised plume photograph in Figure 2. This is of a reduced scale wind tunnel model of an elevated plume behind a building. The building is not clearly visible but its downwind edge is just ahead of the stack and its height is 40% of the discharge height. The unsteady nature of the dispersion is clearly apparent and it is easy to see that over short time scales the concentration of a dispersing contaminant at some point in the plume must show large fluctuations. An example of such a measurement is shown in Figure 3, this is not for the case in Figure 2 but from a field measurement made within the last two years by Helen Higson of the Simon Environmental Technology Centre at UMIST. It is a measurement of the concentration of a tracer released at the ground about 10m upwind of the point of measurement, which is in the centre of the plume; the total time of the trace is about five minutes. The two important features of the measurement are the high level of fluctuation in the concentration and the high intermittency in the signal (that is the significant period of time, about half, when there is no tracer present at all). It is the long term mean of fluctuating concentrations of this sort that are consistent with the conventional time averaged gaussian plume models described above. The mean value of the measurement in Figure 3 is marked as a broken line. It can be seen that the excursions in concentration are well beyond this, the three highest readings in Figure 3 are about eleven times the mean value.

The nose readily perceives the peaks in these fluctuating concentrations in any dispersing odorous material. Furthermore, this form of exposure is well suited to efficient detection. The nose tends to become inured to exposure at steady levels of concentration, so the intermittency in the exposure to a plume allows the nose to be refreshed. In combination with the ability to detect over short time scales, the large excursions in concentration are readily detected. Thus it is the extreme values in the concentration fluctuations that are important in predicting response to odours.

This matter was perfectly well understood when the Concise Guide was produced and it is discussed in the section on dispersion in that document. The problem that existed at that time was the very limited information on the subject (the guide quotes only five references on the subject over a long period), which made it difficult to deal with effectively. The general advice offered on calculating odour dispersion was that the largest excursions in concentration fluctuation did not normally exceed five to ten times the mean value. Thus the larger excursions in the fluctuations could be estimated by using a conventional time-averaged gaussian plume model, but multiplying the odour discharge rate by a factor of ten. This sort of approach can often be found associated with a reference to the 'peak-to-mean' ratio of the concentration fluctuations having a value of this order. At the time the Concise Guide was produced it was possible to do little better, but this approach to the values of a varying quantity is not statistically correct and does not allow a very satisfactory approach to calculating the dispersion of odours. Furthermore, it does not account for the fundamental differences between the distribution of the mean and fluctuating components of concentration in a plume. These questions are discussed below.

An important feature of the distribution of concentration with time at some point in a dispersing plume is that it does not have a nominal occasionally recurring 'peak' value, only the probability that some particular value will occur, The longer the time for which a site is observed, the greater the probability that a higher value of concentration will occur. In principle the upper limit of concentration of some contaminant that may occur is its concentration at the discharge point. In practice, this can happen, at least over short distances up to a few hundred metres, as it has been observed in the field by Jones (1983). A more appropriate way of considering the data is to examine the probability that a particular concentration will occur. Figure 4 shows a cumulative frequency distribution for the measurement in Figure 3. There are two distributions shown, one for the complete signal and one for the signal conditionally sampled only when a positive concentration is present. The distribution for the whole signal is of the greatest interest here. There is no definable 'peak' to the measured concentrations, the 90 percentile of the distribution is about 2.5 times the mean value, the 95 percentile is about five times and the 98 percentile about six times. Frequency distributions of this sort can usually be fitted to log-normal or similar standard forms.

Figure 4 shows only one of a variety of frequency distributions that can occur in different circumstances. Figures 5 and 6 show, respectively, the concentration time trace and its associated cumulative frequency distribution for a plume which has been entrained into a building wake. The measurement is for the same series as that of Figure 3, but a building of 1.5m height has been placed just behind this measurement point and the trace of Figure 5 is at a point on the ground directly behind the building. The plume has been completely entrained in the building wake and its dispersion is dominated by the turbulence in the building wake rather than that in the undisturbed wind. The different nature of the fluctuations in concentration compared with those in Figure 3 are clearly apparent. There is no intermittency and the overall level of fluctuation is much smaller. The cumulative frequency distribution in Figure 6 shows that the 90 percentile of the distribution is about 25% higher than the mean, the 95 percentile is about 35% higher and the 98 percentile about 55% higher. It must be noted that these two concentration measurements are not wholly representative of dispersion in free plumes and around buildings respectively. In free plumes fluctuations tend to be like that of Figure 3 close to the source but tend towards that of Figure 5 at greater distances as the scale of the plume increases compared with the scales of the turbulent eddies which drive the dispersion. In dispersion around buildings a variety of results are also possible. Figure 5 is typical of measurements well inside the building wake of a completely entrained plume. An airborne plume which was intermittently partly entrained into a building wake, a common occurrence, would produce results resembling more those of Figure 3 than of Figure 5. Atmospheric stratification also affects the character of the fluctuating components. Stable stratification tends to damp the fluctuations (though not always), so that they tend to the form of Figure 5, whilst unstable stratification (which is rare in any severe form in the UK) increases them, tending to the form of Figure 3.

Besides the detailed characteristics of the fluctuating components of concentration in a dispersing plume described above, it must be appreciated that the distribution of the fluctuating components of concentration in a dispersing plume do not follow a similar pattern to the mean concentrations even in similar dispersion situations. This is illustrated in Figures 7 and 8. Figure 7 shows measurements of the fluctuating components of concentration in a ground-based plume, in a vertical and lateral cross section. The figure is taken from Figures 6 and 7 of Bara, Wilson and Zelt (1992), the measurements being made at small scale in a water tunnel. The results shown are of the variance of the fluctuations in concentration (that is, the square of the standard deviation) at three different distances downstream of the source. The lateral measurements show a dip in the variance at the centre of the plume and peaks at about 50% of the plume width. The vertical measurements show a maximum at about a quarter of the plume depth above the ground. By comparison, the associated distributions of mean concentration follow a gaussian distribution (as in Figure 1), for the lateral measurement it would be a full gaussian with a central peak in mean concentration and for the vertical measurements it would be a half-gaussian with a peak mean concentration at the ground. Figure 8 is not an experimental result, but a sketch of the sort of distribution along the ground that would be expected from an airborne source (from a discharge stack) of the mean and fluctuating components of the concentration. Typically the mean ground level concentration from an airborne plume rises to a maximum at about fifteen plume heights from the source before falling away steadily with increasing distance. The fluctuating components of the concentration behave differently, partly as a consequence of their lateral distributions across the plume remaining high away from the plume centreline. As a result the fluctuating components reach a maximum closer to the first point of contact of the plume with the ground, before falling away with increasing distance. Thus, for example, the extreme percentiles in the fluctuation will be greater (or more frequent) at this nearer point to the discharge than at the point of maximum mean concentrations. At long distances from the source, the fluctuating components in the plume (such as the variance) tend towards zero, whilst the upper values of the concentration frequency distribution (such as the 90 percentile) tend towards the mean concentration.

It will be apparent from this discussion that the fluctuating components of concentration in a discharge plume do not follow the same pattern as the mean concentration, nor does the common approach of describing the 'peak' concentration in a dispersing plume have much connection with real plume behaviour. The usual dispersion calculation of mean concentration thus seems of limited assistance in estimating the probabiltiy of odours. It will also be apparent that the nature of individual exposure to the pattern of fluctuating concentrations in a plume has implications as to the criteria which should be set for offence caused by odour, beyond attempting to estimate what the 'peak' concentration might be. This is discussed in the next section.

3. Odour Perception and Criteria for Offence

In order to determine a means of preventing odours causing offence, whether by the height of discharge stack or whatever, it is necessary to set some criterion for offence. It is also desirable that this criterion should be in some way related to the way in which individual exposure occurs in practice. The nature of this individual exposure has been described in the preceding section. An individual within the region of a discharge plume where there are high concentrations will be exposed to a rapidly fluctuating level of odour, the distribution of which fits some statistical pattern. The degree of fluctuation may be so large as to comprise short bursts of high concentration alternating with fresh air, or there may be a relatively steady 'background' concentration level on which some degree of fluctuation is imposed.

The total period of exposure in this way will depend on a number of factors. If the discharge is an airborne plume and does not suffer from severe downwash in a building wake or from some other cause, the ground footprint of the plume that includes the region of high concentration is relatively narrow (the included angle of a plume is around 10°) and of limited extent. With the continual changes in windspeed and direction that normally occur due both to long term changes in the weather pattern and to diurnal effects, it is unlikely that this footprint will occupy the same area for more than about an hour. The frequency of recurrence should be relatively low. Even in the most frequently occurring wind directions, a plume will not normally pass over the same point for more than about 5% of the time and the occupation of this point by the high concentration footprint will be some smaller fraction of this. If, instead of being airborne, the plume is largely entrained in a building wake, or if it is initially discharged there, both the persistence and the frequency of occurrence can be expected to increase markedly within the vicinity of the building, as it is likely that the high concentration footprint will cover a greater angular spread than an airborne plume. It would not be surprising if, close to the building, the high concentration footprint in a building wake covered roughly the same area within a range of wind directions of, say, 30°. In circumstances of this sort it would be possible for the plume to persist over the same area for some hours and perhaps as long as a day or more. Similarly, the frequency of recurrence would be higher, up to about 15% of the time for this case.

Human response to odour is normally assessed by way of an odour threshold, either of detection or of recognition, using an olfactometer. The normal way in which the olfactometer is used is to alternate fresh air with a particular concentration of odour, to see if the difference can be detected, This bears a good resemblance to the sort of exposure experienced in practice where the variations in concentration resemble those of Figure 3, though not necessarily when they resemble those of Figure 5. The response to intensity beyond the odour threshold has been the subject of a number of experiments. These generally suggest that odour intensity is perceived either as a logarithmic function of actual concentration (for example, Doving, 1967; Laffort, 1968) or as a fractional power of concentration. That is, perceived odour is proportional to C^n, where C is the concentration and the power, n, is less than unity. The latter presumption is the more popular (see, for example Trygg Engen, 1964; Ottoson, 1970; Wright, 1978; Turk et al, 1980), but the value of n varies significantly between experimenters and with the type of material under investigation. Values lie between 0.2 and 0.95, but are most commonly between 0.4 and 0.6. The other main area of interest in work on sensitivity to odours is the time of exposure for which the nose becomes largely desensitised to the exposed odour (see, for example, Doving, 1967). Values vary depending upon a variety of factors, ranging between tens and hundreds of seconds. A typical value would be about 300s.

Looking at the way in which dispersion occurs in the atmosphere, it seems desirable that any criterion for reaction to odour should relate to this form of exposure. If the dispersing plume contains a high level of fluctuation, it would appear to be a fairly efficient form for encouraging individual response to odour. The features of this that affect human response would seem to be the magnitudes of the larger excursions of concentration, their collective duration and frequency of occurrence. If the level of fluctuation in the plume is relatively small these factors are still significant, but the presence of a more continuous level of odour may alter the perception to it, including desensitisation. Information on human response to odours is mainly of the sort described in the previous paragraph. It largely covers odour thresholds, response beyond thresholds and desensitisation. It does not offer much assistance in the psychology of reaction in terms of the effect of repeated exposure, either in terms of the proportion of the time for which exposure occurs or in the frequency of recurrence, which are the other important features of dispersing plumes. What information there is on the psychology of reaction is still mainly of a general and qualitative sort, numerical information is still unusual; Kolega (1987) gives a good idea of typical work in this area. This makes it difficult to set reaction criteria which relate to normal plume behaviour. In a simple form, this might be the answer to a query such as, 'is there likely to be a greater reaction to a single exposure at a concentration of ten times the odour threshold than to five successive exposures at twice the odour threshold?' In the two cases the quantity of contaminant material in the plume is about the same, but the structure of the plume is different due to the circumstances of its development.

It is possible to imagine a variety of criteria for reaction to odour which might be set depending upon assumptions about the sensitivity to the different features of the exposure. As was noted in the previous section, it is not feasible to set a simple 'peak' level as has been traditionally done, it must also be associated at least with proportionate time. A better equivalent to this might require, for example, that the 98 percentile of the concentration did not exceed the threshold limit or some multiple of it. However, though this indicates the proportion of the time for which this level occurs, it does not cover the frequency of recurrence.

An alternative approach might be to consider an analogy with toxic exposure, in which the combination of exposure time and level are normally related in an expression of the form,

$$\int C^n dt.$$

In toxic exposure problems the reaction to exposure is usually non-linear and the exponent, n, for the concentration commonly has a value between 1.5 and 3. This means that in any exposure to a plume of gas, the degree of exposure is greatly affected by the degree of fluctuation in the plume, the larger this is the greater the effect of the exposure. There is a clear explanation of the effect by Wilson (1990). In the case of odours, it is exposure beyond the threshold which is important, so that it might be more appropriate to use a modified expression of the form,

$$\int (C - C_t)^n dt,$$

where C_t is the odour threshold. However, it will be noted from the discussion above that, for response to odours beyond the threshold, the exponent is of the order of 0.5. On this basis, the implication is that the magnitude of any fluctuations, once they are some way beyond the threshold level, is not of particular importance. This does not seem entirely in accord with experience and is certainly not in accord with conventional wisdom, which invests the extreme values of the fluctuating concentrations in the plume with great importance. The small exponent of the response to odour levels seems well established, so it may be that it is the intermittent nature of any exposure beyond the threshold which is of dominant importance rather than the absolute magnitudes of the fluctuations in concentration beyond the threshold. It may also be noted that, if the exponent is unity, then the integral in equations 1 and 2 gives the mean concentration, which can be determined by a conventional gaussian model. For an exponent of less than unity (but not very small), as in the present case, the conventional model is still applicable, and it might seem as if fluctuations are no longer important in the dispersion calculation. However, this does not account properly for intermittency in fluctuations beyond the threshold. This is doubly critical, since an important feature of intermittency for the present considerations is that the mean concentration when there is material present is increased over the overall mean value in proportion to the intermittency. Thus intermittency leads to higher concentrations when there is material present as well as supplying a good form of human exposure for detection.

In practice this approach, though revealing about some facets of exposure to odours, does not seem to accord very well with practice. As well as can be seen from this discussion, a criterion for reaction to odour should be based on the proportion of the time for which concentrations in a plume exceed the threshold by some set limit, but that the degree of exceedence is less important. Also the rate of repetition of the exposure may be important. In terms of plume dispersion parameters this revolves around the cumulative frequency of the concentrations, the degree of intermittency in the plume and the frequencies associated with the fluctuations. At present there seems to be insufficient information on the psychology of reaction to odours in these terms to set a numerical criterion.

4. Present and Future Approaches to Stack Height Determination for Odours

The objective of the present report is to see how stack height calculations for odorous discharges might be made. At present the only formal advice offered is from the Concise Guide. This gives a number of formulae, of which that discussed in the Appendix here is an example, for assessing various facets of odour dispersion. The main formula given for stack height determination is,

$$H_e = (0.1E)^{0.5},$$

where H_e is the 'effective' stack height (accounting for plume rise) and E is the odour discharge rate in odour units (see the Appendix for details). In order to determine the 'effective' stack height, information on determining the plume rise is given, as is a correction for building downwash (taken from the Second Edition of the Memorandum on Chimney Heights (Dept of the Environment, 1967). A variety of simple formulae of this sort appear in the literature on stack heights. They are usually based on a number of fixed presumptions, including the windspeed at which the maximum pollutant concentration at the ground occurs. The present example is no exception and is probably based on a fixed low windspeed. It would be possible to deconvolve the formula to find its derivation, as with the example in the appendix, but this has not been done as it serves only a limited purpose. In practice these approximations usually lead to a procedure which is only a little better than a rule of thumb. The approach given in the Concise Guide falls rather uneasily between a simple set of instructions for the non-expert and guidance on odour dispersion for the more knowledgeable dispersion modellers, and as such fails to satisfy either party very well.

The greater need is probably for advice to the non-expert. This advice has to be clear and easily understood and to incorporate a method for assessing the odour discharge, followed by a procedure to account for the dispersion (including the effects of plume rise and building downwash) which incorporates the effect of fluctuations in concentration. There are two stages in which this may be dealt with. Firstly, what improvement on the traditional approach can be offered immediately? Secondly, what use can be made of the more recent research data on concentration fluctuations in plumes to provide better advice?

If the traditional approach is followed, then the odorous discharge is first determined in terms of odour units, O_u, defined as,

$$O_u = \frac{V}{O_t} \qquad (3)$$

where O_t is the odour threshold of the discharge and V is its rate of discharge. This equation may be applied to the whole discharge or just to the odorous component (in the latter case the rate of discharge is then just that of the odorous component). Consistent units should be used, so that O_u is in units of m^3s^{-1}. Alternatively, if the odour threshold is given in dilutions, D, then,

$$O_u = V.D \qquad (4)$$

The discharge in odour units is then scaled by some factor (usually between five and ten) and used in a dispersion calculation to determine the stack height which keeps concentrations at the ground from this scaled discharge below the odour threshold. The factor is usually quoted (as in the Concise Guide) as being to account for the 'peaks' in the concentration fluctuations in the plume, which has been discussed previously. However, it also needs to account for two other factors. The first is the uncertainty in many estimates of odour threshold, which are often large. There also seems to be some debate as to whether the threshold for detection or recognition is the most appropriate value to use. The second is the variable sensitivity of the populace to odours. Measurements of odour threshold are normally based on a median of the range of response of the populace, but if it is required that the majority should not detect an odour, then an upper percentile of the range, between the 90 and 98 percentiles, would be more appropriate. Having determined a suitable factored odour discharge, some means of dealing with the dispersion calculation is required. For non-expert use, the new guidance on stack height determination (HMIP, 1993) is satisfactory for this purpose. It accounts for all the major dispersion features (for short term mean concentrations) in stack height determination in a pre-digested form, it offers a significant improvement on the procedures laid down in the Concise Guide and is readily useable by the non-expert. The procedure for using this document following the traditional approach to stack heights for odours would therefore be as follows:

1) Determine the size of the odorous discharge in odour units. That is the discharge rate of the odorous material divided by the odour threshold. If the odour threshold in dilutions to threshold is given for the whole discharge (as with gases from a

process discharge, for example), this is given by the total volume flow rate multiplied by the dilutions to threshold (Equation 4).

2) Multiply this figure by a factor of ten.

3) Treat this value as a Pollution Index and use the new Guidance Note D1 to determine a stack height as with any other pollutant.

That is,

$$P_i = 10.0_u \tag{5}$$

It will be appreciated from the previous discussion that the use of a 'peak to mean' correction in this way is of uncertain reliability and should be used with caution. It can lead in some circumstances to incorrect stack heights, both high and low. However, this procedure remains an improvement on the advice in the Concise Guide, which is all that is presently available.

The second stage is in what use can be made of more recent research data on concentration fluctuations in plumes. The great expansion in this work since the production of the Concise Guide has been remarked upon previously. This has included field measurements (of which the work at UMIST and of Jones (1983), mentioned here, are examples) and small scale measurements in wind tunnels (like that of Bara, Wilson and Zelt, 1992) and more theoretical work (some of this is also reviewed by Bara, Wilson and Zelt). It is not possible to review its usefulness for the present problem here. It is mainly basic research data on free plumes, none of it directly addresses the question of stack height determination and there is little (except the UMIST work) on the effects of buildings. However, it does contain a great deal of new information on the fluctuating properties of plumes, including much that is useful to odour dispersion properties, A fair amount of attention has been given to intermittency in plumes and there is some, but limited, information of the frequency of repetition of fluctuations. The greatest deficiency is on the effects of building downwash on fluctuations in plumes. However, the amount of information on this topic is increasing as the field work at UMIST is continuing and there is also presently a parallel programme of small scale wind tunnel measurements of fluctuating concentrations around buildings (at Warren Spring Laboratory) which could be used for this purpose.

There have also been a number of numerical models developed for predicting the fluctuating concentrations in dispersing plumes, those of Hogstrom (1972) and Hanna (1984) are well known, as well as more recent efforts by Erbrink (1991) and Wilson; these and other models are discussed in Bara, Wilson and Zelt (1992). Also, most recently in the United Kingdom, the newly developed Atmospheric Dispersion Modelling System (ADMS) includes a module to predict plume fluctuations. Most of these models predict the bulk statistical properties of the plume, so are of more limited assistance in dealing with questions of intermittency and the frequency of repetition of fluctuating peaks, though Bara, Wilson and Zelt show some success in predicting intermittency. None of these models deals with the effects of buildings on dispersion.

One of the main problems in making use of this information is the difficulty, discussed in the previous section, in setting a suitable criterion for reaction to odour which incorporates these characteristics of atmospheric exposure, especially the effects of intermittency and the repetition frequency of the exposure. Lacking this data it would still be useful to assume a number of plausible criteria and to see what these would imply in setting acceptable stack heights. Some of these possibilities have been provisionally addressed by Jones (1983). The most convenient practical approach to stack height determination for odour problems still remains along the lines of the recent guidance (HMIP, 1993) and an investigation of different criteria could usefully consider the ways in which this guidance would need to be modified. There are two main options. Firstly, despite their fundamental differences, it may be possible to derive a relatively simple relationship between the conventional calculation procedure based on mean concentrations and the relevant fluctuation criteria for odours, which can be used as a simple addendum to the existing guidance on stack heights for mean concentrations. If such a relationship can be found, it would certainly be more complex than the simple factoring proposed in the Concise Guide. Secondly, if this cannot be done, then it becomes necessary to deal separately with dispersion for odours and to carry out a complete new set of dispersion calculations which would lead to a new set of guidelines (by way of equations or graphs, as before) for odorous discharges.

5. Conclusions and Recommendations

1) The markedly different nature of dispersion, compared with conventional time-averaging gaussian dispersion models, as it affects odours has been discussed.

2) In the light of (1), the inappropriate nature of the conventional approach to calculating odour dispersion, that of using a time-averaged gaussian dispersion model with a factored rate of discharge to account for 'peak-to-mean' ratios, is explained.

3) The relationship between human perception of odour and the way it is experienced in practice has been considered, in the interests of setting a criterion for reaction to odour which can be related to unsteady dispersion parameters. Without this it is difficult to carry out a meaningful dispersion calculation for odours. Unfortunately, existing information on human response is too limited to do this reliably. In particular, there seems to be no information on the relationships between magnitude and frequency of exposure in terms both of intermittency and of frequency of repetition. A programme of investigation of this subject would be of great value.

4) The practical options for determining stack heights presently and in the future have been considered. An improved version of the traditional 'peak-to-mean' approach has been suggested, based on the new guidance on stack height determination, though the uncertain nature of this approach is stressed. For the future, it would be more appropriate to make use of the substantial amount of new research data on fluctuations in dispersion, together with some of the more recent models, to find a better procedure. This is hampered by the lack of an appropriate criterion for human reaction to odours, noted in (3) above. However it should still be possible to make progress in this area by assuming some plausible criteria and investigating their effect on stack height determination. For an improved stack height determination procedure, there are two possible end products. Firstly, it may be

possible to find a relatively simple modification which can easily be applied to the new guidance on stack heights for polluting emissions. Failing this, it would be necessary to devise a new set of stack height guidelines.

6. Acknowledgements

The work described here was carried out at the Warren Spring Laboratory, prior to its closure, as part of the Department of the Environment's research programme into environmental problems. The authors have now transferred to the Building Research Establishment to continue their activities there.

7. References

Bara B.M., Wilson J.D., Zelt B.W. (1992). Concentration Fluctuations from a Water Channel Simulation of a Ground Level Release. *Atmospheric Environment*, Vol 26a, No. 6, pp1053-1062.

Clark R.H. (1979). A Model for Short and Medium Range Dispersion of Radionuclides Released to the Atmosphere. National Radiological Protection Board, Report No. R91.

Trygg Engen (1964). Psychophysical Scaling of Odor Intensity and Quality. Annals of the New York Academy of Sciences. pp504-525. Also a paper on 'Man's Ability to perceive Odors'. No date or reference.

Dept of the Environment (1967). Chimney Heights – Second Edition of the Clean Air Act Memorandum. HMSO.

Dept of the Environment (1981). Chimney Heights – Third Edition of the Clean Air Act Memorandum. HMSO. ISBN 0 11 751556 6.

HMIP (1993). Guidelines on Discharge Stack Heights for Polluting Emissions. Technical Guidance Note D1 (Dispersion). HMSO. ISBN 0 11 752794 7.

Steven R. Hanna (1984). Concentration Fluctuations in a Smoke Plume *Atmospheric Environment*, Vol 18, pp1091-1106.

Ulf Hogstrom (1972). A method for Predicting Odour Frequencies from a Point Source. *Atmospheric Environment*, Vol 66, pp103-121.

Kjell B. Doving (1967). *Problems in the Physiology of Olfaction Chemistry and Physiology of Flavours.* Ed. H.W. Schultz, Chapter 3.

Kolega (1987) Ed. *Environmental Annoyance, Characterisation, Measurement and Control.* Elsevier Science Publishers, ISBN 0-444-80865-5.

Jones C.D. (1983). On the Structure of Instantaneous Plumes in the Atmosphere. *Journal of Hazardous Materials*, Vol 7, pp87-112.

Laffort P. (1968). Some New Data on the Physico-Chemical Determinants of the Relative Effectiveness of Odours. *Theories of Odour and Odour Measurement.* Ed. Anyolac.

Ottoson G.R. (1970) How we Recognise Odours. New Scientist, 15 October.

Turk A., Switala E.D., Thomas S.H. (1980). Suprathreshold Odour Measurement by Dynamic Olfactometry: Principles and Practice. *J. Air Pollution Control Assoc.*, Vol 30, pp1289-1294.

Valentin F.H., North A.A. (1980). *Odour Control – A Concise Guide.* Published by Warren Spring Laboratory on behalf of the Department of the Environment. ISBN 0 85624 2144.

Wilson D.J. (1990). Model Development for Exposure-1 and Shelter-1: Toxic Load and Adverse Biological Effects for Outdoor, Indoor and Evacuation Exposures in Dispersing Toxic Gas Releases. Report No. 73. University of Alberta, Department of Mechanical Engineering.

Wright R.H. (1978). The Perception of Odour Intensity – Physics or Psychophysics? *Chemical Senses and Flavour*, Vol 3, No. 1, pp73-79.

APPENDIX

The 'Maximum Distances of Complaints' Formula in the Concise Guide

Page 105 of 'Odour Control – A Concise Guide' gives, in Section 11.4.4, a formula (11.16) for the maximum distance at which complaints are likely to occur from an odour source. It is in the form,

$$d_{max}\,(2.2DF)^{0.6} = (2.2E)^{0.6}$$

where E is the odour emission rate Q/α. Q is the discharge rate of the odorous material and α is the odour threshold of the material.

This formula seems to be causing some puzzlement and questions as to its accuracy and reliability, particularly as it claims to be derived from experimental data and the details of the experimental measurements were not given. It is, however, possible to derive the expression theoretically after making some plausible assumptions, this is outlined below.

For a plume released at the ground, maximum concentration is given by,

$$\alpha = \frac{Q}{\pi U \delta_y \delta_z}$$

where, δ_y and δ_z are the horizontal and vertical standard deviations of the plume spread and U is the windspeed. Rearranging gives,

$$E = \pi U \delta_y \delta_z$$

Values of δ_y and δ_z are sometimes given in the form,

$$\delta = Ax^b,$$

with the values of A and b depending upon the atmospheric stability. Singer and Smith (see Pasquill and Smith 'Atmospheric Diffusion' p338 for the details) give values of A of .07 and .048 for δ_y and δ_z respectively for a neutrally stable atmosphere and of .042 and .008 for a stable atmosphere. Similarly, they give values of b of 0.76 for a neutral atmosphere and 0.71 for a stable atmosphere. Feeding this into the expression for E, above, gives,

$$E = \pi U A_y A_z X^{2b}, \text{ or}$$

$$X = \left(\frac{E}{\pi U A_y A_z}\right)^{\frac{1}{2b}}$$

The expression is, strictly speaking, for the mean concentration and for odour dispersion some allowance must be made for the peak excursions in concentration, rather than the mean, to which the nose normally responds. Ball park figures for the difference are often quoted as being a factor of 5-10. Taking values of a low windspeed of $2ms^{-1}$ for U (when the highest concentrations of ground sources tend to occur) and the neutrally buoyant dispersion results for δ_y and δ_z, together with scaling E by a factor of 10 to account for peaks in fluctuations, gives,

$$x = (5E)^{0.66}.$$

This is very close to the expression in the Concise Guide. In practice the value of the constant can be varied considerably depending upon the assumptions made. For example if a stable atmosphere is assumed the value of the constant becomes about 50 and the exponent become 0.7. Similarly, if the assumed windspeed or the ratio of mean concentration to peak fluctuation is varied the constant can be altered. Also, the values of δ_y and δ_z are not precise, those given by Singer and Smith are relatively low compared with those given by the NRPB model, but this is also a factor of averaging time. Finally, the experimental data for which the original expression was derived would almost certainly have involved a building close to the odour sources investigated; this gives a significant initial dispersion and would lower the value of the constant. This would explain why the constant seems a little low compared with theoretical expectations.

Irrespective of all this, the expression in the Concise Guide for the likely maximum distance of complaint for an odour source does have some basis in theory and the value of the constant given is, in a ball park sense, of the order that might be expected. This does therefore seem to be a useful equation. It is, however, for order of magnitude estimates only. That is, are we concerned with distances of tens of metres, hundreds, or kilometres?

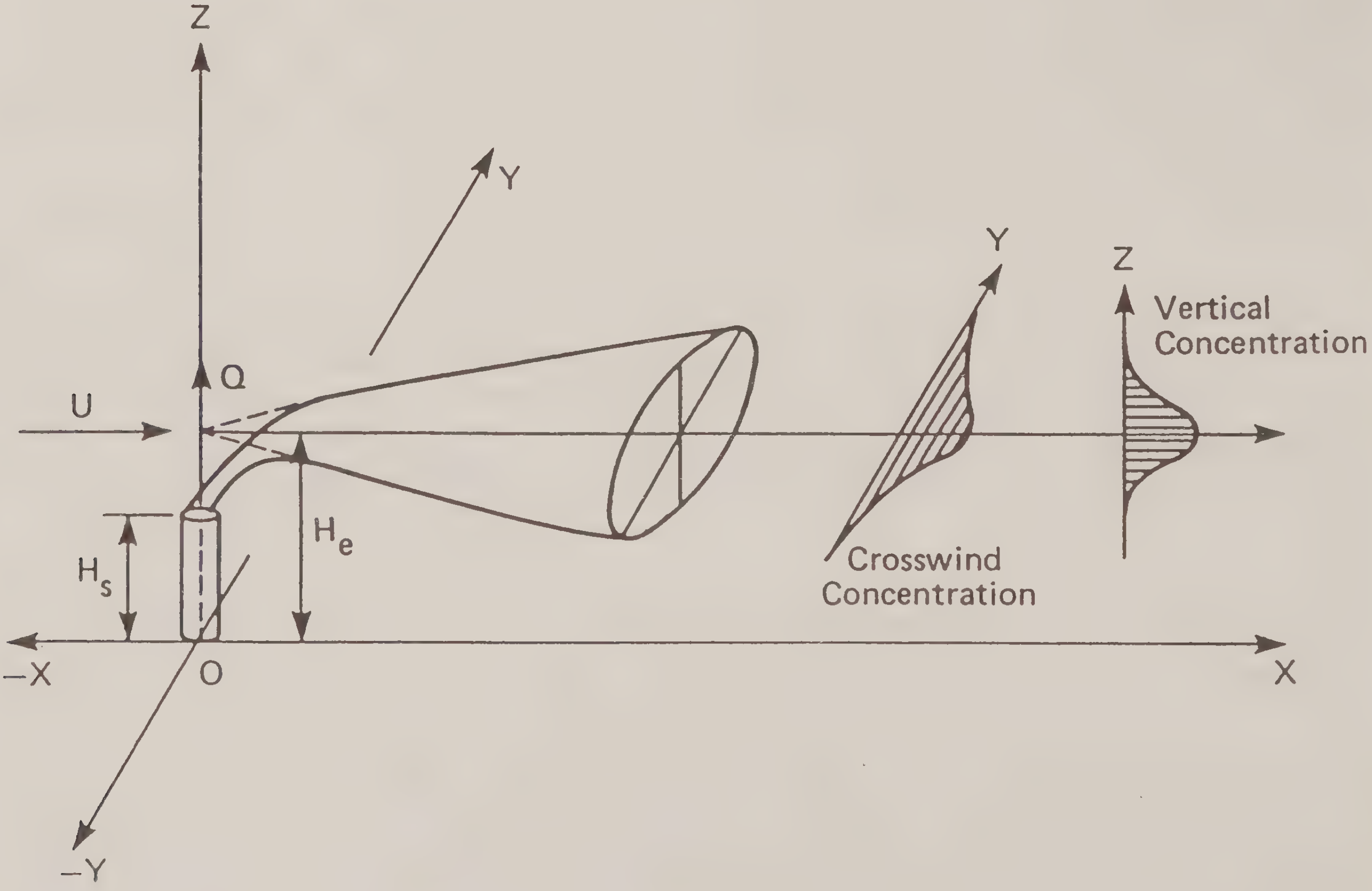


Fig 1. A Gaussian Plume Dispersion Model

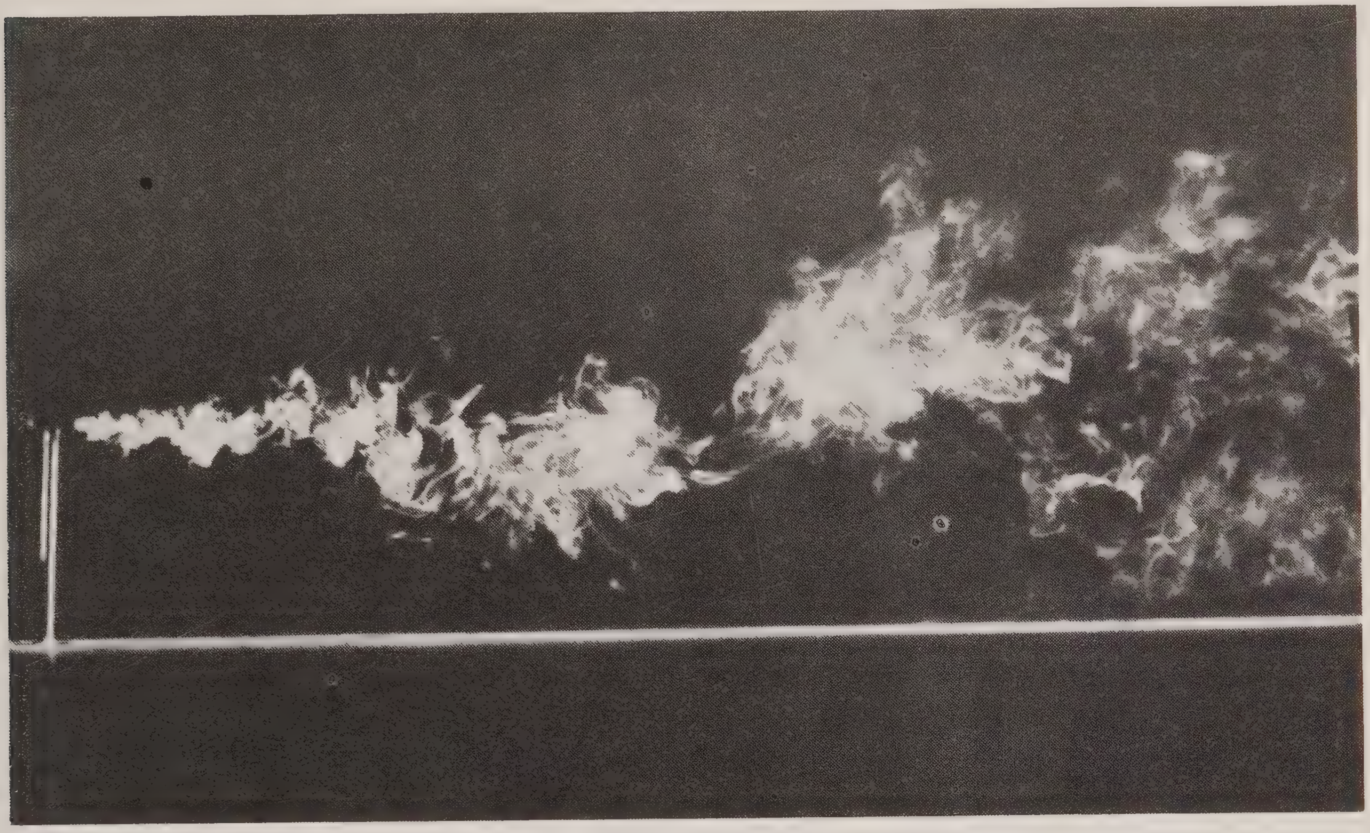


Fig 2. A Reduced Scale Wind Tunnel Model of a Dispersing Plume from an Elevated Source Behind a Building

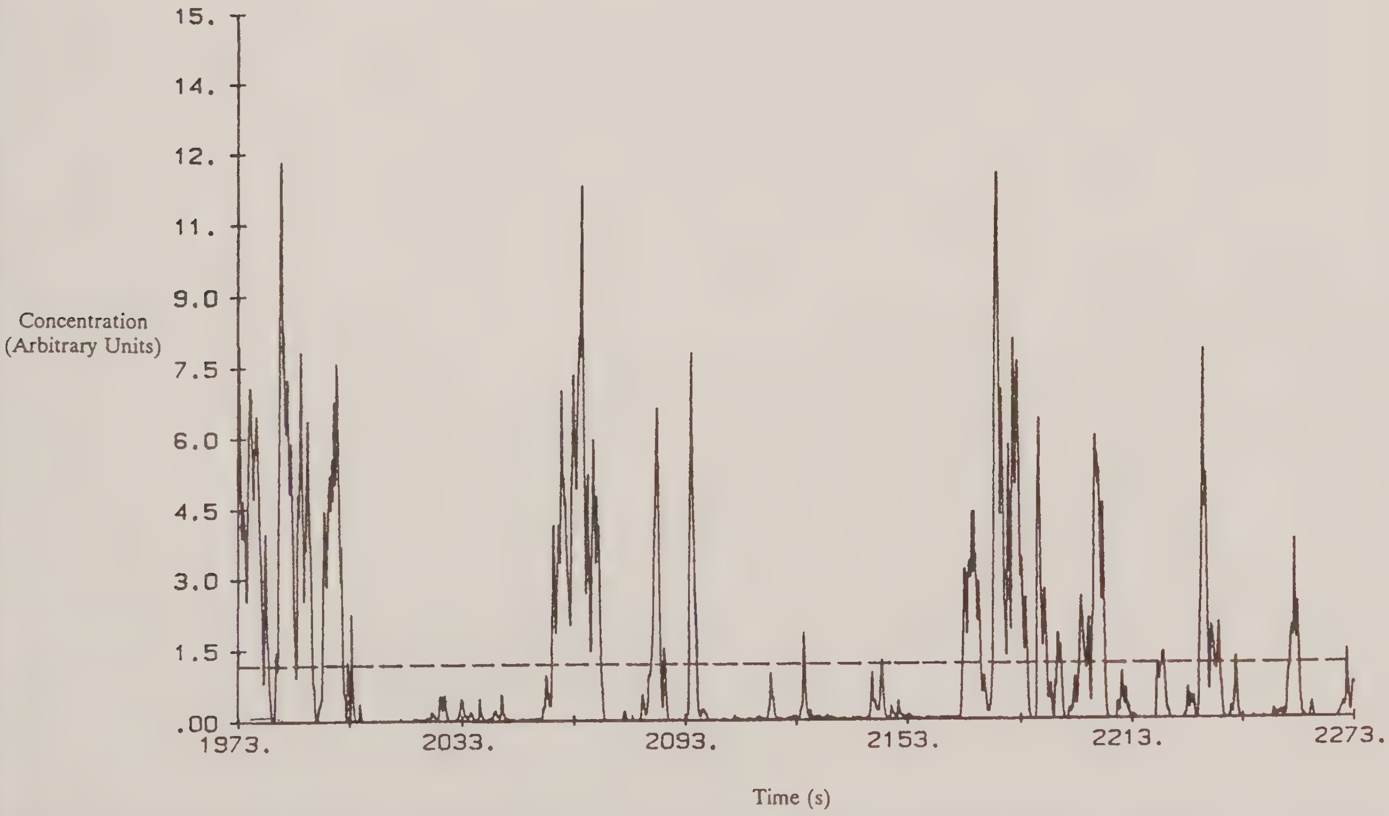


Fig 3. Short Term Concentrations Measured in a Plume. Data taken from Centre of a Ground-Based Plume 10m from the Source — — — mean concentration

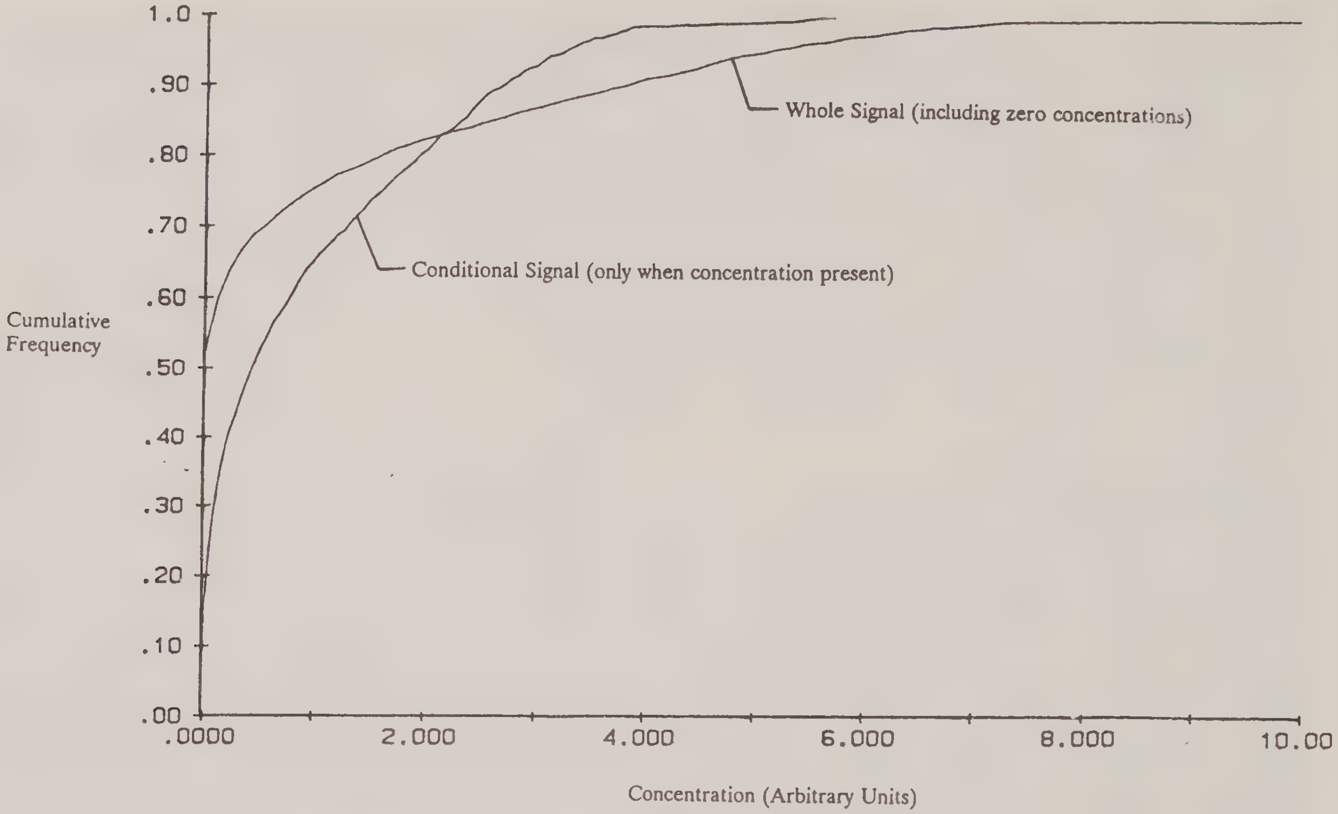


Fig 4. Cumulative Frequency Distribution of Concentration for the Measurements of Figure 3

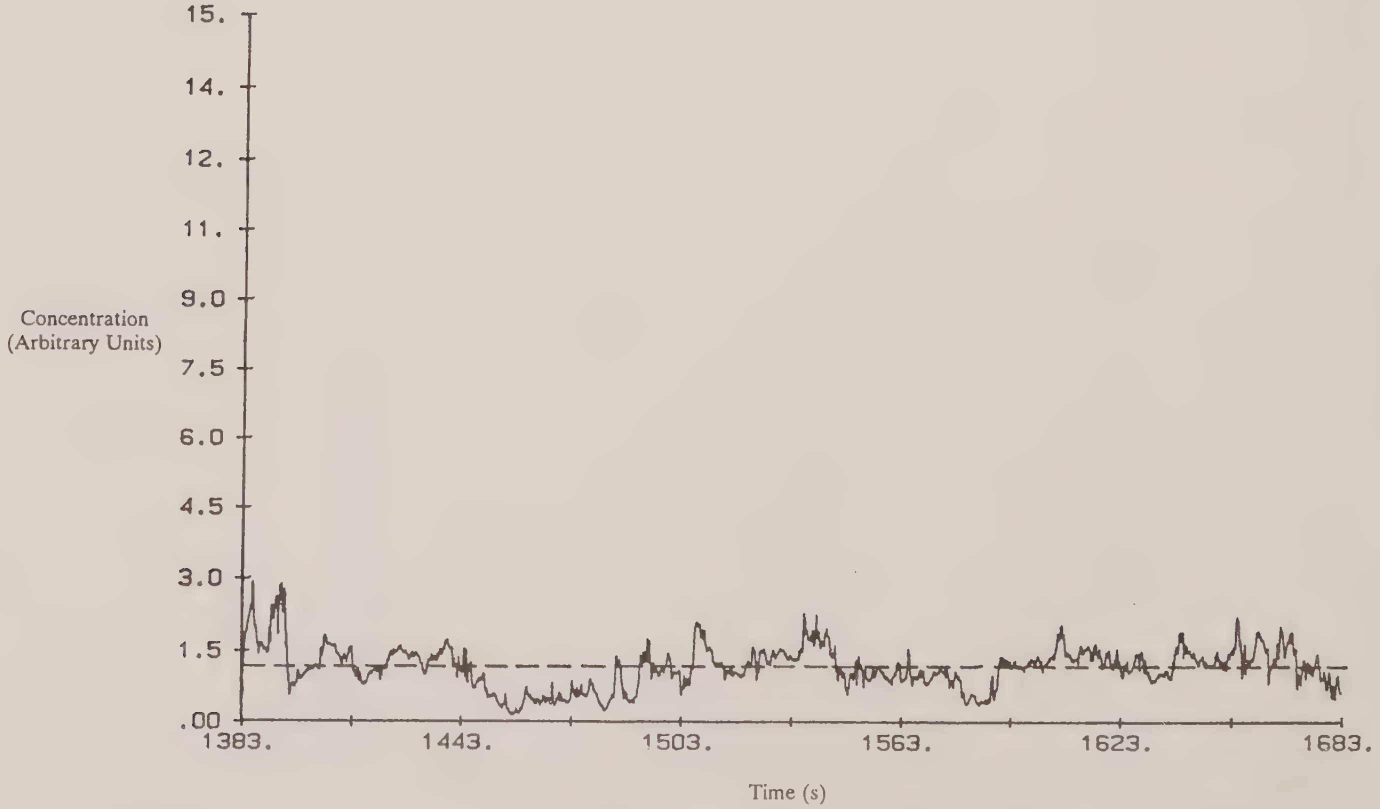


Fig 5. Short Term Concentrations Measured in a Plume. Data taken from the Ground Directly Behind a Building Interposed at the Measurement Point of Figure 3
— — — mean concentration

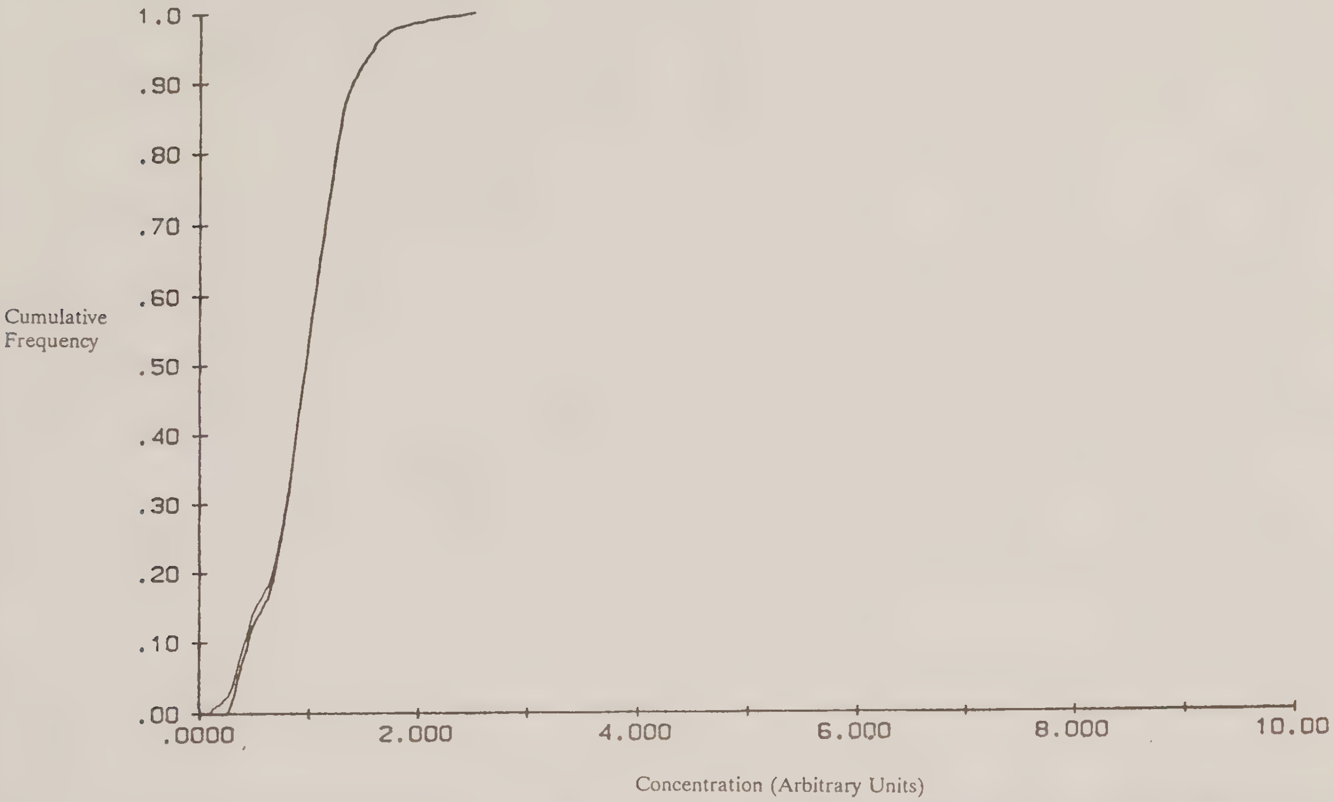


Fig 6. Cumulative Frequency Distribution of Concentration for the Measurements of Figure 5

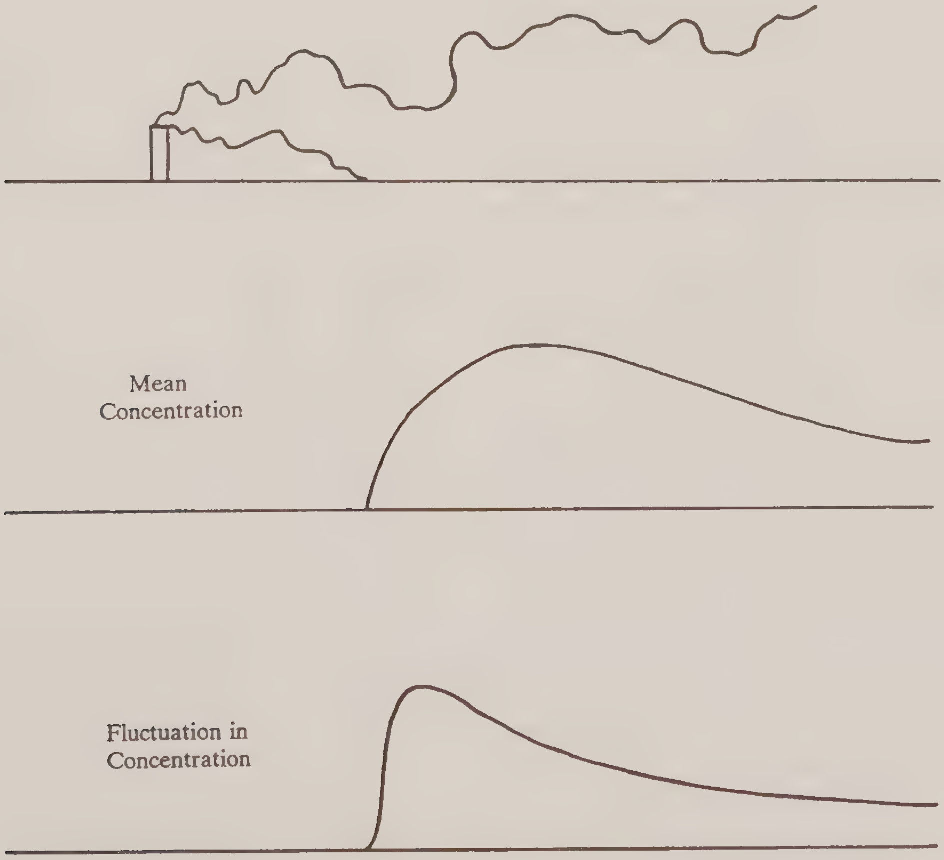


Fig 8. Ground Level Distributions of Mean and Fluctuating Components of Concentration from an Airborne Plume

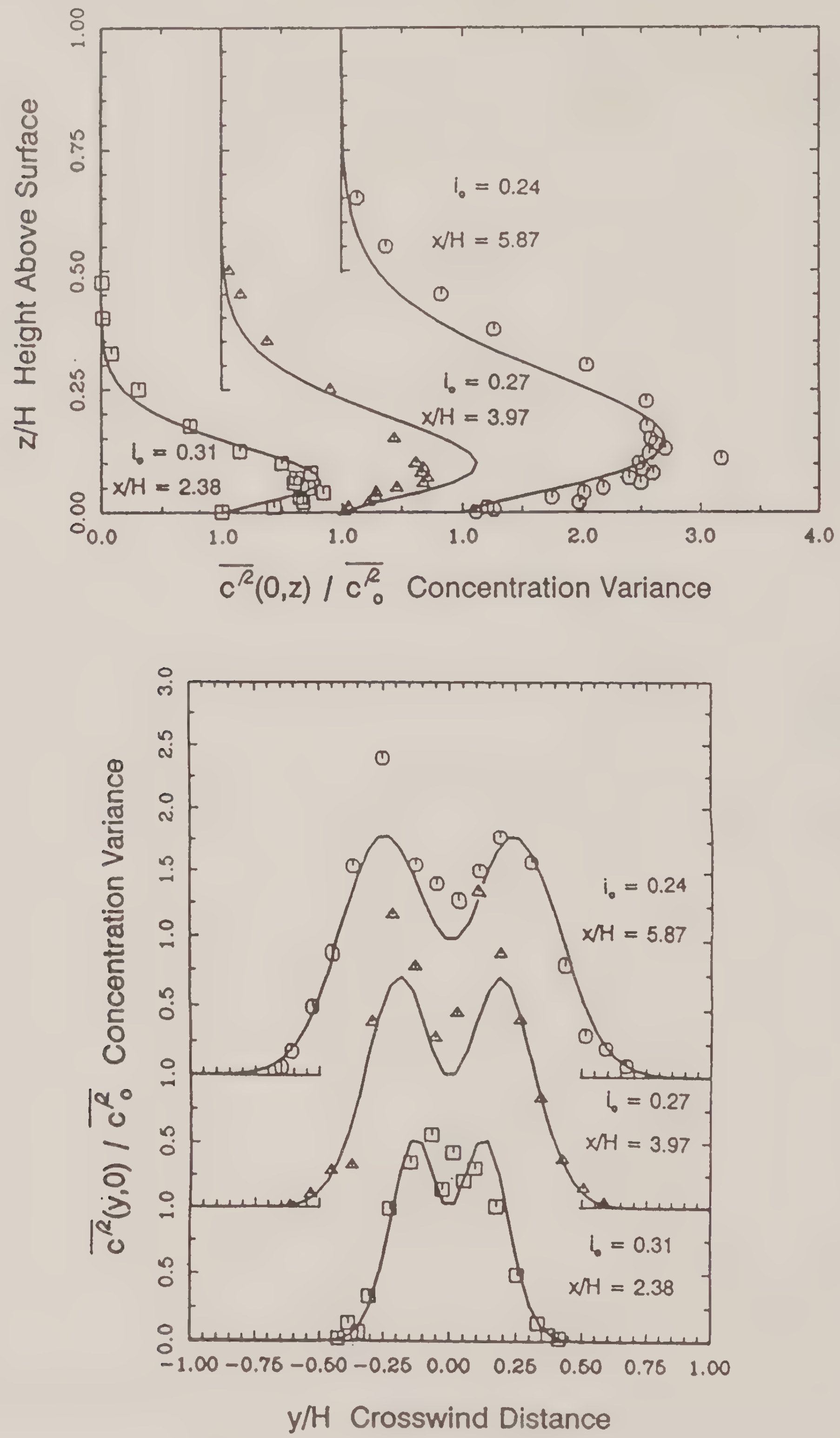


Fig 7. Distributions of the Fluctuating Components of Concentration (the Variance) Across a Ground Based Plume From Bara, Wilson and Zett (1992)

UPDATE

EPA PRESCRIBED PROCESSES

The amendments to SI472 have now been published as the *Environmental Protection (Prescribed Processes and Substances Etc) (Amendment) Regulations 1994* and the *(Amendment) (No. 2) Regulations.*

Regulation 2 amends the *Applications, Appeals and Registers Regulations* and require HMIPI to consult islands and districts councils in relation to Part A processes to ensure that waste is recovered or disposed of without causing noise nuisance. This came into effect on 1 June.

Regulation 3, which also came into effect on 1 June, amends certain sections of Schedule 1 to the 1991 Regulations; it is mainly concerned with exempting certain processes from Part B local authority air pollution control.

Regulation 4 does not come into effect until 1 December. This also largely deals with amendments to Schedule 1 to the 1991 Regulations; it relates to the prescribing of certain processes as either Part A or Part B processes and the transfer of processes from/to Part A and Part B. It also amends Schedule 5 of the 1991 Regulations to include amounts in excess of background quantity of prescribed substances released to water in any 12 month period which would result in the process being brought under IPC.

The *Amendment No. 2 Regulations* amend Schedule 6 of the 1994 amendment Regulations; this deals with transitional arrangements for processes which cease to be prescribed, transfer from/to Part A or B or which are newly prescribed as Part A or B processes.

Copies of both sets of Amendment Regulations are available from HMSO, price £3.70 and £1.55 respectively.

OZONE MONITORING

The *Ozone Monitoring and Information Regulations 1994*, which implement the EC Directive on Air Pollution by Ozone, came into effect on 21 March 1994. They extend throughout the UK and require monitoring stations to be set up or designated for measuring ozone concentrations as specified in the Directive. They also require the public to be informed when average hourly ozone concentrations exceed 90 ppb; more explicit health advice should be given when average hourly concentrations exceed 180 ppb.

MOTORCYCLE NOISE CODE

The Code of Practice on Noise from Organised Off-road Motorcycle Sport 1994 has been put together by a number of bodies including the NSCA, the Manchester Area Pollution Advisory Council and the Noise Council (who have published it). Representatives of the motorcycle industry and motorcycle sports were also involved. The Code outlines legal controls over motorcycle events (e.g. possible need for planning permission, nuisance legislation); and ways of reducing noise emissions (of motorcycles and e.g. through sensitive siting of start and finish areas).

While the Code has not yet been approved under s.71 of the *Control of Pollution Act 1974*, it is hoped that it will be of help to both those organising off-road events and to EHOs advising on and checking noise levels.

The Code is available, price £5.00 from the Noise Council, Chadwick Court, 15 Hatfields, London SE1 8DJ.

AIR QUALITY MONITORING AND MANAGEMENT

In 1974, WHO and UNEP established the GEMS / AIR programme to assess and monitor air quality on a global scale. GEMS stands for Global Environment Monitoring System. Among the initial aims of the programme were to assist participating countries to develop air monitoring systems, increase the comparability, compatibility and validity of urban air quality data and to foster the exchange of information. During this first phase standardised data on SO_2 and suspended particulates were submitted to the global database from 86 cities in 45 countries.

The GEMS / AIR programme has now entered its second phase with the overall objective of providing the comprehensive information needed for rational air quality management. This will include the provision of an international framework for coordinated and valid monitoring of urban air quality, effective data management, and reliable information dissemination; and developing methodologies for comprehensive monitoring and assessment of urban air quality adapted to the needs of participating countries. To this end two handbooks have been published under the general title of the *GEMS / AIR Methodology Review Handbook Series.*

Volume 1, Quality Assurance in Urban Air Quality Monitoring is largely based on a paper prepared by John Bower (formerly WSL) and looks in detail at the objectives of a QA / QC programme and its organisational and operational features; it also contains sections on setting monitoring objectives; the role of QA in data harmonisation; priority urban air pollutants; air monitoring methodologies; and data usage and exchange.

Volume 2 looks at Primary Standard Calibration Methods and Network Intercalibrations for Air Quality Monitoring. This, too, is largely based on work carried out by former WSL staff, S. Eaton and B.P. Sweeney. Part 1 of this includes sections on techniques for the preparation of primary standards and establishment of national gas standards laboratories and QC; Part 2 includes network intercalibration techniques, performing network intercalibrations and site audits and applicability of intercalibration to sampler-based monitoring networks.

Forthcoming volumes in this series are Measurement of Suspended Particulate Matter in Ambient Air, and Active and Passive Sampling Methodologies for Measurement of Air Quality.

The above publications are available from the WHO, Prevention of Environmental Pollution, CH-1211 Geneva 27, Switzerland.

ENVIRONMENTAL ACCREDITATION

The National Accreditation Council for Certification Bodies (NACCB) is now inviting certification bodies and environmental verifiers to apply for accreditation as part of the initial phase of environmental accreditation. This follows the announcement that the NACCB is to be responsbile for accrediting verifiers under the European Union Eco-Management and Audit Regulation as well as certification bodies for BS 7750.

The Eco-Management and Audit Regulation, which comes into force in May 1995 requires each Member State to establish a Competent Body charged with setting up and maintaining a register and setting fees for sites participating in the scheme, providing guidance and information on the working of the scheme and to represent the UK on the Regulatory Committee. The scheme, which is voluntary, will apply initially only to industrial sites and aims to facilitate the implementation by companies of a structured, flexible and recognised approach to the management and continual improvement of their environmental performance.

NACCB has drawn up criteria for bodies which will certificate sites to BS 7750 (the newly revised environmental management standard) and to the EU's Eco-Management and Audit Scheme (EMAS) established last year.

The initial phase will last until the end of 1994. During this time applicants will not receive accreditation, but the work performed on assessing them will be used to test and if necessary develop the criteria, so that these should be approved at the end of the year. Those applicants who have stayed the course should then receive accreditation, and their clients (who have participated) receive accredited certification. Later applicants will then be assessed against the approved criteria.

The National Accreditation Council for Certification Bodies (NACCB) was established in 1984. It advises the Secretary of State for Trade and Industry on the accreditation of certification and inspection bodies. These assess suppliers' quality systems to see if they meet the requirements of the internationally agreed standards ISO 9001/2, known in Europe as EN 29001/2 and in Britain as BS 5750 Parts 1 and 2. These bodies also inspect and test products to see if they conform to standards or meet specified requirements. Some assess personnel.

EARLY TO WORK TO CUT TRAFFIC FUMES

Public utility workers in Athens are to start work one hour earlier, at 7.00 a.m. during the summer. It is hoped that staggering working hours and thus reducing the build up of traffic at peak times will lead to a reduction in the exhaust fumes which lead to the summer smogs; these are estimated to be responsible for about 100 deaths each year.

Other measures include banning cars carrying less than three persons from the inner traffic ring on those days when pollution is bad; all vehicles will be required to have an annual emission test and to carry a valid certificate of approval — any that don't will be fined. A telephone hot line has also been set up for Athenians to report polluting vehicles.

Despite starting work earlier, Athenians will, however, not be able to go straight from a nightclub to work — several months ago the Public Order Ministry banned nightclubs from staying open until dawn in an attempt to stop employees falling asleep at their desks!

BOOKS AND REPORTS

COMPUTERISED ENVIRONMENTAL MODELLING
A Practical Introduction Using Excel

J. Hardisty et al, John Wiley and Sons, 1994. £14.95, ISBN 047193822X.

Divided into three sections, the book deals with general principles of environmental systems modelling, examples that familiarise the reader with the use of spreadsheets (with particular reference to Excel) and a set of topical environmental models. A supplementary disk is available at £9.95. Based on an undergraduate course, modelling is addressed using easy to use and accessible software.

AQUATIC POLLUTION
An Introductory Text

W.A. Laws, John Wiley and Sons, 1994. £57.00, ISBN 0471588830.

This volume provides a complete introduction to pollution of oceans, lakes, streams and groundwater. It explains ecological and toxicological principles relevant to water pollution, with seventeen chapters including eutrophication, urban runoff, thermal pollution and plastics in the sea. Aimed at undergraduate level, it provides an excellent overview of a complex subject to anyone interested in water pollution.

PROTECTING THE ATMOSPHERE
The Climate Change Convention and its Context

S. Nilsson and D. Pitt, Earthscan, 1994. £13.95, ISBN 1853831611.

This book provides a guide to the Framework Convention on Climate Change, agreed at the Earth Summit in June 1992. It aims to explain the evolution of and necessity for the convention. It also examines how it should be interpreted and implemented.

TOLLEY'S ENVIRONMENTAL HANDBOOK
A Management Guide

Ed. Freshfields Environment Group, Tolley, 1994. £39.95, ISBN 0854597492.

Designed to serve the needs of lawyers, managers and other professionals, this book seeks to bring together the major elements of environmental policy and law. It aims to explain their significance and opportunities they present in best practice in environmental management. Current to June 1993, it covers all aspects of environmental management ranging from atmospheric pollution to presenting a green image.

HEATING ADVICE HANDBOOK

J. Green, Energy Inform Ltd, 1993. £12.99, ISBN 0907800157.

The book aims to provide effective information and advice on energy efficiency in the home. It looks at health risks from the cold, tariffs and bills, grants, heating systems and insulation. It is primarily a book for advice workers, but is a useful source of information for anyone concerned with domestic energy issues.

STATE OF THE WORLD 1994

L. Brown et al, Earthscan, 1994. £9.95, ISBN 1853831794.

In its eleventh edition this annual report covers an analysis of the earth's carrying capacity, an analysis of the World Bank as well as computers, oceans, power industries and forests.

AIR POLLUTION AND HEALTH: UNDERSTANDING THE UNCERTAINTIES

Institute for Environment and Health, 1994. £12.50, ISBN 1899110003.

This is a collection of papers presented at the inaugural workshop of the Institute for Environment and Health, based at Leicester University. It describes the current state of understanding of the uncertainties about links between air pollution and health, and recommends appropriate ways forward. Reports cover exposure assessment, health effects of air pollution, effects of short and long term exposure and prevalence of disease.

THE GREEN MANAGEMENT REVOLUTION

Lessons in Environmental Excellence

W. Hopfenbeck, Prentice Hall, 1993. £35.00, ISBN 132764520.

Aimed at management at all levels in marketing, finance, production and others who want to implement an environmental policy, the book covers all areas of business. It includes case studies from European and American companies and sets out to demonstrate the necessity for a coherent and integrated environmental policy.

THE ENVIRONOMENTAL EFFECTS OF PESTICIDE DRIFT

Ed. A.S. Cook, English Nature, 1994. £11.00, ISBN 1857161246.

A collection of seminar papers covering aspects of pesticide drift, including safe spraying principles, plant tolerances, effects on lichens and invertebrates and conservation implications.

UK ENVIRONMENTAL BUSINESS CLUB DIRECTORY

Business in the Environment 1994.

A directory covering 80 environmental business clubs and networks across the country. It is intended to be updated periodically.

INTEGRATED POLLUTION CONTROL
The First Three Years

K. Allot, ENDS, 1994. £64.00, ISBN 0907673090.

The report takes the reader step by step through the IPC process. It guides applicants through the authorisation process and explains potential problems. Case studies of individual companies look at the costs of application for and compliance with authorisations. It also scrutinises HMIP enforcement of the law and handling of public registers.

AIR MONITORING BY SPECTROSCOPIC TECHNIQUES

Ed. M.W. Sigrist, Wiley, 1994. £66.00, ISBN 047155875.

Six chapters examine the characteristics, applications, advantages and limitations of various spectroscopic air monitoring techniques. The instrumentation required and future developments in the techniques are also examined.

ENVIRONMENTAL AWARENESS

Institution of Chemical Engineers, 1993. £300.00, ISBN 1 898945 519.

AIR EMISSIONS VOLUME 1, OVERVIEW

Institution of Chemical Engineers, 1993. £320.00.

These training text/slide packages are the first in the Institution's ambitious programme of 20 which will eventually give an overview of environmental management in the process industries and provide both the technical background and management tools necessary for implementation. The Institution has consulted widely on the content of the packages, and has presented them in a way which would enable the trainer to master the subject and then present it to audiences of any level. Inevitably the packages are costly because there is material which might not be essential for some purposes. That said they will make it possible to make polished presentations tailored to individuals value for money.

TOXIC AIR POLLUTION HANDBOOK

Ed. David Patrick, Van Nostrand Reinhold, 1994. £86.00, ISBN 0442009038.

David Patrick joined the US Environmental Protection Agency in 1970 to implement the hazardous air pollution control regime introduced by the 1970 amendment to the Clean Air Act. He left in 1990 having advised on the 1990 amendments to the Act which set out programmes for rational control of emissions to air of the 189 substances which the Agency judges to be of greatest environmental significance on grounds of their toxicity and likelihood of release as a result of human activity.

He has now encouraged nearly thirty of those with whom he collaborated while at EPA to contribute to a handbook which deals expertly and in detail with all aspects of its subject from the political and legal background, through health and exposure assessment, regulatory strategies and control methods to risk communication. A particular strength of the book is the breadth of its referencing which makes it very easy for the reader to progress to relevant literature, data bases or software.

UK legislation on control of air toxics is much less prescriptive than that now in place in the US, but it does place more onus on the process operator to prove the acceptability of what he or she proposes to do. The *Toxic Air Pollution Handbook* could be of enormous help to regulator and regulated alike as they struggle to turn the promise of UK regulations into reality. It will be invaluable also to those who represent the public interest in their attempts to decide whether what has been done in their name is indeed adequate.

PROFITING FROM LOW GRADE HEAT

Ed. A.W. Crook. Published by Institute of Electrical Enginers (Michael Faraday House, 6 Hills Way, Stevenage SG1 2AY). 1994. £40.00, ISBN 0852 96835.5.

This is the 26th report of the Watt Committee on Energy and results from a 1991 conference. Its theme is the utilisation of rejected heat and other low temperature sources (i.e. below 250 degrees C). It covers the scientific bases, engineering problems and solutions relating to the topic. It also indentifies engineering developments under way and installations in existence in order to show up technical and economic details. A particular bonus of the book is the near comprehensive glossary of energy terms, definitions, symbols, units and equivalents.

TRADE AND SUSTAINABLE DEVELOPMENT

Robert Repetto, for UNEP, Environment and Trade, Palais des Nations, 1211 Geneva 10.

In recent years the debate on how best to integrate environmental considerations into trade rules and practices has intensified. Many of the issues facing decision-makers involve a complex array of legal, economic and scientific/risk assessment considerations.

The purpose of UNEP's work in the trade and environment debate is to identify areas in which environmental questions can be clarified through background research and analysis. This, therefore, is the first in a series of approximately 20 titles which will include: Concepts and principles in international environmental law; Trade measures in the Montreal Protocol.

British Standards:

CHARACTERISATION OF AIR QUALITY Part 4. Stationary source emissions. Section 4.4 Determination of the mass concentration of sulphur dioxide — Performance characteristics of automated measuring methods, BS 6069: Section 4.4: 1993, ISO 7935: 1992.

METHODS FOR MEASUREMENT OF AIR POLLUTION Part 13: Determination of the particulate lead content of aerosols collected on filters: atomic absorption spectrometric method.

Available from BSI, Linford Wood, Milton Keynes MK14 6LE.

FUTURE EVENTS

5-7 SEPTEMBER – IEHO CONGRESS '94

Quality of service is to be a key issue and an environmental protection policy statement is to be launched. Sessions are planned on housing, occupational health and safety, food and environmental protection.
Venue: Bournemouth.
Details: Helen Jones, IEHO Conference & Exhibition Department.
Fax: 071 261 1960.

**6-8 SEPTEMBER –
ENVIRONMENTAL ANALYSIS FOUNDATION COURSE**

The course aims to provide training in the environmental analysis of water, waste, effluent, sludge and soil, through lectures, seminars and practical demonstrations / experiments. It is aimed at both chemists and non-chemists working in the field .
Venue: University of Sussex, Brighton.
Details: Jane Davies, BETA Specialists, Tel: 0243 354103.

12 SEPTEMBER – WASTE MANAGEMENT LICENSING

One day conference offering step-by-step guide through the new Regulations.
Venue: Caledonian Hotel, Edinburgh.
Details: Christine Rickards, IBC Legal Studies and Services. Fax: 071 631 3214.

**14-15 SEPTEMBER –
SCIENTIFIC EXPERTISE IN EUROPEAN PUBLIC POLICY DEBATE**

This conference (which is free) aims to examine the role of scientific expertise in public policy debates across Europe, its relationships within differing political and administrative decision-making processes and the implications in particular for problematic transboundary and global issues. The conference is sponsored by the European Commission and organised by the LSE as part of the European Science and Technology Forum.
Venue: London School of Economics.
Details: Mr. Shiraz Oshidar, LSE, Fax: 071 955 6814.

23 SEPTEMBER – URBAN AIR POLLUTION AND PUBLIC HEALTH

This one day conference organised by the Environmental Change Research Centre will present the latest results of Government-funded research on urban air pollution and will discuss its implications for human health, and for transport policy.
Venue: Friend's House, Euston Road, London NW1.
Details: Mattea Di Gaetano, ECRC, University College, London, Tel: 071 436 9248.

NEW NSCA LEAFLET

CHOOSING AND USING A CLEANER CAR

This leaflet examines the relative merits of vehicles currently available – second hand petrol cars, new petrol cars with a three way catalytic converter, diesel cars and diesels with an oxidation catalyst.

Price £5.00 per 100 or £34.50 per 1000.

CALL FOR PAPERS

18th International Association against Noise Congress

TRAFFIC NOISE CONTROL IN EUROPE

The 18th AICB Congress will be held in Bologna (Italy) at the Faculty of Engineering, in the second week of September 1995.

The congress will provide an opportunity for international experts to discuss problems of outdoor noise control and will consist of plenary sessions, with invited lectures, and concurrent sessions. Contributed papers will be orally or poster presented. The plenary lectures will be presented by international experts and will cover specific topics of outdoor noise control. At the same time, there will be an exhibition of instruments and tools relating to the theme of the congress. The results of a test on traffic noise numerical simulations will be presented.

The working languages for the congress will be English and Italian and the papers will be presented in the language of the Author's choice.

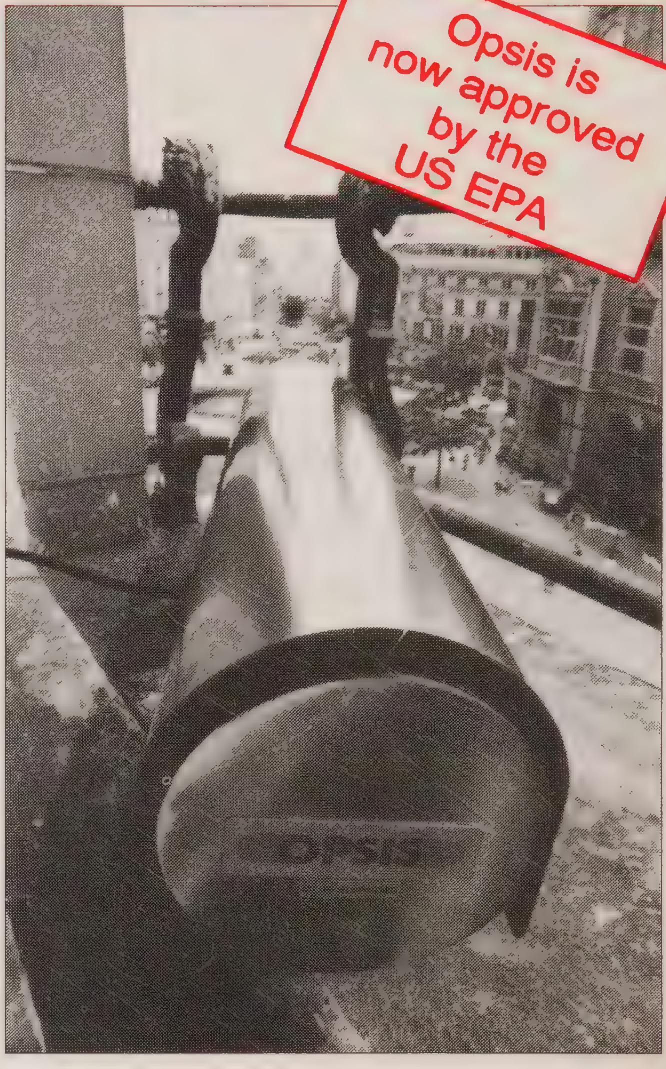
Anyone interested in presenting a paper should send a one page summary by 31 December 1994 to

The Secretariat
International Association Against Noise
(AICB)
Hirschenplatz 7
CH-6004 Luzern
Switzerland

Enviro Technology Services plc

STANDARD OPSIS SYSTEM PACKAGES

Opsis is now approved by the US EPA



For Local Authorities

For air quality monitoring, the AR500LA measures both criteria pollutants and hydrocarbons. The standard package measures Benzene, Toluene, $N0_2$, $S0_2$ and 0_3.

Upgradeable to include other gases.

For Emissions Monitoring

Standard packages are available for non-extractive emissions monitoring of incinerators or combustion plant. One system will operate up to twelve lightpaths, monitoring several points in a process and/or multiple stacks. Systems will measure N0, $N0_2$, $S0_2$, $C0_2$, H_20, HCl, Hg, NH_3 and others.

Opsis also accepts process inputs (flow, temperature, pressure etc) allowing a full range of CEM reports for HMIP etc.

Upgradeable to include other gases.

Emissions Computers

Running OPSIS' EmVision and Stat 500 software, these computers will accept logged data from multiple inputs for a full range of display, reporting and stastical functions on air quality or process emissions.

Opsis' Approvals include TÜV and UMEG.

Enviro Technology Services plc,
Environment House, Dudbridge Road, Stroud, Glos GL5 3EE
Tel: (0453) 751641 Fax: (0453) 757596

nsca

CLEAN AIR

AND ENVIRONMENTAL PROTECTION

AUTUMN 1994

Volume 24 **Number Three**

NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION

Graseby Andersen
are now manufacturing
environmental monitoring instruments
in the UK for:

PM10
particulates
& VOCs

Phone us now on 0689 877767
for an information pack on ambient
and stack monitoring applications

GRASEBY
ANDERSEN

GRASEBY ANDERSEN LIMITED
RIVER HOUSE, LAGOON ROAD, ST. MARY CRAY, ORPINGTON, KENT UK BR5 3QX
TEL: 0689 877767 FAX: 0689 876661

AUTUMN 1994
VOLUME 24
ISSN 0300-5734

CLEAN AIR

Publishing Director:
Dr. Tom Crossett
Secretary General, NSCA

Editor:
Loveday Murley

Information/PRO:
Tim Brown

Advertising:
Sally May
Rates on request.

CLEAN AIR is the official journal of the Society but the views expressed in contributed articles are not necessarily endorsed by the Society.

CLEAN AIR is issued free to Members and Representatives of Members.

CLEAN AIR Subscription for 1994 — £22.00

Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements are made.

CLEAN AIR is printed and published in England by the National Society for Clean Air and Environmental Protection,
136 North Street
Brighton BN1 1RG
Tel: Brighton (0273) 326313
Fax: Brighton (0273) 735802

CONTENTS

Editorial 103

NSCA News and Views
— Environmental, Economic and BPEO Assessment Principles for Integrated Pollution Control 105
— The Monitoring and Dispersion of Emissions for Part B Processes 107
— Statutory Nuisance Noise Controls: Operation and Problems 109
— NSCA Policy Statements and Replies to Consultation Documents 111
— Budget Submissions: Company Car Taxation and Tobacco Taxation 112
— NSCA Scottish Division 113

Reports
— Assessment of Personal Exposure to Air Pollution: Kevin Loth & Mike Ashmore 114
— Planning Policy Guidance — PPG 13, Transport: Simon Hickmott 123

Update 128

Books and Reports 134

Future Events 139

Advertisers
— Graseby Andersen cvr ii
— Enviro Technology Services Plc cvr iv

NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

(Founded 1899)

Registered Charity, Number 221026

PRESIDENT
Professor The Lord Lewis, KT, FRS
IMMEDIATE PAST PRESIDENT
The Baroness Platt of Writtle, CBE, DL, FEng
VICE-PRESIDENTS
Mr. K. Collins, MEP; The Rt. Hon. The Earl of Cranbrook, DSc, DL;
Wayne David, MEP; John Edmonds; Dr. Caroline Jackson, MEP;
Air Commodore John Langston, CBE; Sir John Mason, CB, DSc, FRS:
The Rt Hon Lord Nathan; Cllr. L. Poole, BEM, JP; Sir Hugh Rossi; Mr. J. Speirs;
Gareth Wardell, MP
CHAIRMAN OF COUNCIL
Cllr. Dr. J.R.P. Evans
DEPUTY CHAIRMEN OF COUNCIL
Mr. G.W. Barrett, Mr. P. Cooney
IMMEDIATE PAST CHAIRMAN OF COUNCIL
Mr. K.G. Kaufman
HONORARY TREASURER
Mr. R. Hill
SECRETARY GENERAL
Dr. R.N. Crossett

HONORARY SECRETARIES OF NSCA DIVISIONS

Scottish Division: Calum MacDonald — Telephone: 041 227 5552
City of Glasgow DC, Environmental Health Dept.,
23 Montrose Street, Glasgow G1 1RN
Northern Ireland Division: Mervyn Fleming — Telephone: 0232 401805
67 Kilwarlin Road, Hillsborough, Co. Down BT26 6EA
Northern Division: Keith Atkinson — Telephone: 0325 352692
30 Loraine Crescent, Darlington, Co. Durham DL1 5QU
North West Division: R.N. Turner — Telephone: 051 443 4731
45 Down Green Road, Harwood, Bolton BL2 3QD
Yorkshire & Humberside Division: Stephen Carden — Telephone: 0924 295391
City of Wakefield MDC, 29 King Street, Wakefield WF1 2SY
West Midlands Division: J. Sweetland — Telephone: 0952 202558
Senior EHO, Pollution Control, Wrekin Council, Civic Offices, PO Box 212, Telford TF3 4LB
East Midlands and Eastern Divisions: Dr. Bill Pearce — Telephone: 0623 656656, ext. 3139
Environmental Health Services, Mansfield DC, Civic Centre, Chesterfield Road South, Mansfield, Notts NG19 7BH
South East Division: J.J. Beagle — Telephone: 081 452 0203
19 Oxgate Gardens, Brent, London NW2 6EA
South West Division: P. Gendle — Telephone: 0934 634509
Environmental Health Department, Woodspring District Council, P.O. Box 140, Town Hall, Weston-Super-Mare, Avon BS23 1AE
South and Mid Wales Division: T. Jones — Telephone: 0495 766775
28 Maes-y-celyn, Griffithstown, Pontypool, Gwent

EDITORIAL

ROADS TO SUSTAINABILITY

For half a century or more we believed that mobility would deliver quality of life: we would only need to create wealth and spread the benefits through societies across the globe.

The flaws in this argument have been obvious to a few for some time but now traffic tops the sustainability agenda. However reliable — and politically acceptable — measures to define and attain sustainable levels of traffic remain elusive.

Reports suggest that the Royal Commission on Environmental Pollution will recommend that the motorist and haulier should pay the full external costs of their enforced pleasure which they currently enjoy at half price. Will this be enough? Almost certainly not. Growth in mobility and mobility dependence have fuelled one another. Raising the cost of mobility is a necessary but not sufficient measure to attain sustainability. We shall almost certainly also need intervention to reduce mobility and the environmental impact of that mobility. In short we shall need less miles, less polluting miles and miles which use less fuel.

To succeed we shall need to adopt new attitudes and we shall have to build an environment where these new attitudes can be expressed without penalty. Urgently we must take actions which will give not only quick dividends but also which will lay the foundations for improvement in the things which we can change only slowly. We are spearheading action on dirty diesels — over two hundred local authorities have sought details of our dirty diesel detection scheme — and have promoted action to identify grossly polluting vehicles so that their owners can bring them into line or face the consequences.

But we need to do more.

To reduce the environmental footprint of traffic we must now decide how we can secure a well maintained energy efficient vehicle fleet. We need to achieve consensus on how responsibility for the necessary actions is to be shared between vehicle manufacturers, fuel suppliers, owners and operators. We need to agree how the consensus is policed for a vehicle fleet which is replaced once every 10-15 years.

To reduce dependence on mobility we must offer alternatives to the car and make our communities more compact. The change will be costly, demanding and slow but international considerations may mean that we do not have the luxury of choice.

We look forward to the RCEP report for guidance and we are sure that we shall not be disappointed. However the guidance is likely to be only preliminary and qualitative. It will be up to the Society and kindred bodies to test that guidance against reality and to translate it into advice which Government can use to intervene for the common good.

NSCA TRAINING SEMINAR

TARGETING TRAFFIC POLLUTION
- options for local air quality management

THURSDAY 8 DECEMBER 1994
Gallery Suite - National Exhibition Centre
BIRMINGHAM

- traffic management
- strategic planning
- pollution monitoring
- spotting schemes
- public awareness
- new technology
- green commuting
- enforcement powers

For a copy of the brochure contact NSCA on 0273 326313

TRAINING SEMINAR

PART B PROCESSES - UPDATE

This seminar will cover the recent changes to the Prescribed Processes and Substances Regulations and will assist Local Authorities in the implementation and enforcement of Part I of the EP Act 1990.

– This Training Seminar is being held twice –

SOUTH - LONDON
Monday 12 December 1994

Organised by the *South East* Institute of Public Health

NORTH - WAKEFIELD
Tuesday 13 December 1994

Organised by NSCA

For a copy of the brochure contact NSCA on 0273 326313

NSCA NEWS & VIEWS

ENVIRONMENTAL, ECONOMIC AND BPEO ASSESSMENT PRINCIPLES FOR INTEGRATED POLLUTION CONTROL

HMIP Consultation, April 1994

In a detailed consultation document published in April, HMIP outlines principles for conducting environmental, economic and BPEO assessments of processes prescribed for Integrated Pollution Control under Part I of the *Environmental Pollution Act 1990.*

In preparing guidance on selecting the Best Practicable Environmental Option, the experience gained during the first three years of IPC regulation in combination with the results of an extensive R&D programme has been used.

A summary of NSCA's comments follows. A copy of the full response, which comments on specific paragraphs of the consultation document, is available from Sally May at NSCA.

NSCA Comments

Tuning environmental protection regimes to environmental, economic and social circumstances is one of the main challenges of sustainable development. We welcome the principles which the document proposes as a constructive step along the road towards arrangements which would allow the full potential of Part I of the *Environmental Protection Act 1990* to be exploited in England and Wales. We welcome also the Inspectorate's continuing commitment to a practical approach to environmental, economic and BPEO assessment which can be implemented with present understanding and refined as new techniques and further information become available. The latest proposals are a substantial advance and meet some of our earlier concerns. In particular, we welcome proposals for a methodology to deal with solid and liquid waste arisings, and the development of guidance and economic assessment of site specific process and abatement options.

That said, we believe that there is considerable room for further improvement to the principles, the guidance on their interpretation and implementation in relation to circumstances, and mechanisms for refinement of the principles and guidance. The aim should be to ensure that both HMIP and industrial resources are deployed in proportion to the risk of harm, and that success is measured by reduction in harm and improvement in process efficiency. From this point, refinement should involve both further discussion of principles and pilot trials of their application to a variety of processes at various scales and on sites subject to different environmental sensitivities.

We support strongly the three stage approach proposed in the Consultation Document:

— Stage 1: preliminary assessment of the base case and generation of alternative process and abatement options in terms of emission and release inventories.
— Stage 2: environmental assessment of the base case and other practicable process control and abatement options.
— Stage 3: determination of BPEO by examination of the site specific costs and benefits of abatement and process options.

Consideration of data of known quality under these three headings in relation to standards and guidelines relevant to local, national and global environmental issues provides a logical framework for both expert and societal judgement of the acceptability of particular developments. We welcome the assurances in the document (para 94) that 'the selection of the BEO must be a matter of professional judgement where all factors are considered in the assessment' and in para 107 that 'the final justification of BPEO should weigh all relevant factors based on expert judgement'.

It is disappointing, therefore, that the current proposal places so much emphasis on a single figure, the Integrated Environmental Index (IEI), which sums over time the effects of all pollutants to all media. We do not believe it is valid or helpful to compare or add environmental quotients, because underlying environmental quality standards and environmental assessment levels are based on very different assumptions in relation to risk and precaution. Ratios of this kind may be extremely misleading. An additonal concern is that where an environmental quality standard has not been set, it will be a matter for debate which standard or guideline is appropriate and what degree of precaution is relevant. Moreover, inclusion of diverse issues in the IEI can obscure controversial value judgements and prejudge the relative importance attached to various components of environmental impact, when this relative importance should itself be subject to debate and scrutiny by expert and lay interests.

We do not believe that circumstances have changed materially since 1988, when the Royal Commission on Environmental Pollution published its Report on BPEO(1), which cautioned strongly against systems which combine scores for a number of factors into a single answer. We therefore support the alternative approach which the Royal Commission advocated at the time. Environmental profiles for each option should be prepared, comparing performance for perhaps six characteristics in numbers, words or symbols, and either in absolute terms or relative to environmental quality targets, as appropriate. Guidance, but not prescription, on factors to be included in the environmental profile of particular processes could be given in process guidance notes.

The adoption of appropriate environmental profiles in preference to the integrated environmental index would make it much easier for statutory consultees and others with an interest in BPEO for particular developments to ensure that their concerns were being satisfied. The distinction between facts and scientific deductions, and conclusions which depend on value judgement would also be more transparent, and justification of the appropriate degree of precaution would be simpler.

1. Royal Commission on Environmental Pollution (1988), Best Practicable Environmental Option, 12th report, CM 110, HMSO, London. ISBN 0-10-103102-5.

THE MONITORING AND DISPERSION OF EMISSIONS FROM PART B PROCESSES

DOE/WO/SOED Consultation Paper, June 1994

The Government intends to revise Process Guidance Notes for Part B processes at least every four years. Most of the current notes were published in 1991 and the above consultation paper asks for views on two issues which are of relevance to almost all PG Notes — emission monitoring standards and requirements for emission dispersion. Comments on these two issues will then be taken into account in the detailed review of individual PG Notes which will begin shortly. References in brackets relate to specific paragraph numbers in the consultation paper.

NSCA Comments

General Comments

1. The consultation paper betrays a trend towards an interpretation of BATNEEC which is potentially weaker than the concept of Best Practical Means which it supersedes. Monitoring is an integral part of pollution abatement and monitoring techniques should be the best available for the purpose, not entailing excessive cost. Abatement techniques designed to achieve specified emission standards but which are incapable of being monitored should not be considered BATNEEC. For instance monitoring particulates from simple cyclones is considered impracticable because they cannot be sampled isokinetically (2.20). This should be taken as an indication that cyclones without ducts to facilitate monitoring are not BATNEEC, rather they are the cheapest possible option to meet an indefinite and indeterminable standard of emission and should therefore not be permissible.

2. No mention is made of the importance of quality assurance and independent verification of data. We are alarmed that the trend toward self-regulated industry is becoming a trend toward unregulated industry. Regulators must be able to assure themselves — and an increasingly sceptical public — that the data is representative of real operating conditions and can be trusted.

3. The title "Monitoring & Dispersion of Emissions from Part B Processes" reinforces the impression that Part I of the *Environmental Protection Act 1990* is a two-tier system with local authority controlled processes representing a lower level of concern. Part B processes outnumber Part A by twenty to one and their combined potential for environmental impact is at least as significant as HMIP/HMIPI controlled plant. The objectives for authorisations under EPA 1990 are identical for Part A and B processes; the aim of this consultation should be consistency of guidance on monitoring and dispersion, to ensure that the terms of authorisations are met. An alternative title would be "Monitoring and Dispersion of Emissions from Processes Prescribed under EPA 1990 (Guidance for Local Authorities)".

Monitoring

4. We agree that "*. . .a key step should be to decide what information is needed to ensure adequate regulation of the process. . .industry should not be expected to undertake any more monitoring than is absolutely necessary to adequately ensure compliance with the relevant control parameters*" (2.17). However this is translated into a shorthand objective of a "*. . .minimum amount of monitoring necessary to secure adequate level of emissions control*" (1.7). This ignores the essential principle that any monitoring must relate to and match the conditions in the authorisation. It is the authorisation which determines the adequate level of emission control; monitoring is the guarantee of compliance.

5. Distinction must therefore be made in authorisation conditions between the requirements to monitor for compliance with specific emission limits; compliance with surrogate indicators; or to detect failures in performance of abatement equipment. These must be supported by monitoring data of sufficient quality; more could be said about appropriate levels of accuracy in monitoring equipment and standard errors in monitoring data. If as a result the monitoring is impracticable or too expensive then it is the condition in the authorisation which needs to be reconsidered. Monitoring is the key to enforcement and must be designed to demonstrate compliance with authorisation conditions.

6. Given that monitoring must be tuned to authorisation conditions, we would caution against further recourse to surrogate indicators (2.21) where direct techniques are available, unless direct techniques fail the BATNEEC test for industry as a whole. Further, we consider it inappropriate to recommend a reduction in monitoring requirements (2.24) on the basis of past performance. Some abatement techniques can fail suddenly or may have an increasing frequency of transient exceedances. Historical data is not necessarily an indicator of continuing performance. On the contrary there should be a presumption that all prescribed processes ultimately will be subject to a requirement to monitor releases in a quantitative fashion. We accept that there may be no point in monitoring where plant is incapable of meeting the PG Note standards prior to upgrading. But the authorisation should make provision for monitoring to demonstrate continuing compliance, once plant is upgraded.

7. No thought is given to the possible use of monitoring data from Part B Processes to extend the Chemical Release Inventory, which as it is currently constituted will give only a partial picture of chemical releases from UK industry. This would certainly require a consistent level of quantitative monitoring.

8. With regard to other criteria to be applied in reviewing the PG Notes (2.20), our comments on *practicability* are given in para 2 above. In terms of *availability*, our comments relating to the use of surrogates in para 6 above are relevant. Continuous monitoring of *low mass emissions* may be still justified where the process output is variable and emission peaks may overwhelm abatement equipment. Even if chemically benign, highly visible emissions still have *potential for harm* according to the EPA 1990 definition of harm which "*. . .in the case of man, includes offence caused to any of his senses. .*".

Dispersion

9. We agree that it is desirable to use common technical guidance for dispersion calculations (3.2) from all prescribed processes. However there is a possible confusion in interpretation of Technical Guidance Note D1 between the need to adjust chimney heights for the height of nearby buildings in Section 5.4, and the overriding minimum requirements in Section 6.2 which relate to opening windows or ventilation inlets. The first adjustment is made because of the effect of the buildings on hindering dispersion from the stack, and the second because of the impact of emissions from the stack on nearby buildings. This leads to the curious possibility that planned stack heights could in some circumstances be reduced by locking any openable windows nearby. The minimum stack height requirements in PG Notes are related to roof ridge height, and thus presumably to dispersion. We seek an assurance that adoption of D1 in PG Notes would not weaken the effectiveness of dispersion.

10. There is increasing evidence of the health impacts of particulate matter below 10μm, impacts which appear to be unrelated to speciation. We recommend that any changes to guidance on dispersion of particulate matter (3.6) be reviewed in consultation with the Department of Health.

* * *

STATUTORY NUISANCE NOISE CONTROLS OPERATION AND PROBLEMS

Department of the Environment
Discussion Paper, June 1994

Introduction

This discussion paper looks at the effectiveness of the current noise control framework. Essentially it asks two questions: are existing powers adequate, and if not, would the introduction of a lower level of legal test — noise annoyance — improve matters.

NSCA welcomed the discussion paper — neighbour noise is one of the major issues in our workload and we continue to detect a high level of concern from both the public and regulators.

NSCA Comments

The discussion paper points to three indicators of dissatisfaction:

- variability in local authority response;
- the length of time taken for action; and
- the small numbers of notices served.

When the Society carried out a survey of neighbour noise control policy in 1990, a principal finding was the very wide range of responses made by local authorities. While the *Environmental Protection Act* has clarified the responsibilities of local authorities, we believe there is still some variation in response. Many local authorities are still coming up to speed and it may be premature to seek new powers until the full implications of EPA 1990 have sunk in. We intend to repeat our survey later this year in order to test the extent of changes in practice.

The NSCA's National Noise Committee considered the need for further legislation and felt that on the whole the powers to act are now adequate, but with two reservations. First, the resources to implement the new powers are not always available and second, particularly in the case of one-off noisy events, cooperation with the police is not always forthcoming.

The Society has proposed a number of ways in which the current powers could be enforced more effectively. One is for a memorandum of understanding between DOE and the Home Office on EHO/police cooperation. The second was to update the NSCA local authority guidelines, published September 1994*. These aim to provide an acceptable baseline response to noise complaints and encourage the formation of formal noise policies by local authorities.

An important element in the NSCA guidelines is the use of customer satisfaction surveys. Contrary to the view of the discussion paper, the small number of notices served is not necessarily an indicator of how badly the complaint system is working. Many complaints may have been dealt with efficiently without the service of a notice, whilst those that have resulted in a notice may still be lingering problems. Non-legal alternative routes are often less confrontational and may result in more effective resolution of disputes. We need more information about how many complaints are not resolved satisfactorily, and why. The use of customer surveys by local authorities would give a much clearer indication of the adequacy of the current system, and whether customer dissatisfaction relates to inappropriate procedures, internal management failure, lack of resources, or inadequate legal powers.

From the point of view of speeding up action, we believe that much greater use should be made of equipment confiscation, certainly in the enforcement of one-off incidents and possibly as an alternative or in addition to fines where notices are contravened.

The one area where we believe legal loopholes still exist relates to noisy vehicles and light aircraft. NSCA has made recommendations on the former — in vain to date — and the Department of Transport is currently consulting on the latter. We would urge that rapid progress is made in these areas.

In summary, if the Department is to pursue further legal remedies for noise control, it must be satisfied that the current system is inadequate, and know the reasons why. We suspect that the current system could prove to be adequate given further refinement and added resources, and would caution against precipitate action until there is substantial evidence to the contrary.

Would a Lower Level of Test Help?

We would give wholehearted support to anything which facilitates the task of asembling evidence and speeds up the process of enforcement. However we are not convinced that a "lower" level test of noise annoyance would be sufficiently distinct from the concept of nuisance to be useful on either count. If a good case can be made for noise nuisance then action should be taken as speedily as possible. If it cannot, we doubt whether simply being annoyed by noise should carry the option of legal action. From a civil liberties viewpoint, the right to make reasonable amounts of noise has to be balanced against an individual's right to peace and quiet in their own home. A legal test based on being annoyed would run the danger of blurring these two rights. Of two people living in the same house, one might be annoyed by a particular noise and the other not. Should action be taken?

One possibility would be for local authority officers to take advisory action at noise levels which are considered annoying, with a warning that continuing to cause annoyance would be considered to be creating a statutory nuisance, which would be subject to legal action. This would in effect legitimise the current practice of sending informal letters on first receipt of noise complaints.

Further guidance on the sort of tests used to establish nuisance would also assist; the degree of audibility, intrusiveness, timing and so on. NSCA will continue to publish information and promote good practice on this question.

*A copy of NSCA's Local Authority Guidelines on dealing with Noise Problems, revised September 1994, is being sent to all local authorities. Copies are also available from Sally May at NSCA.

* * *

NSCA POLICY STATEMENTS AND REPLIES TO CONSULTATION DOCUMENTS

July-September 1994

Please contact Sally May at NSCA, 136 North Street, Brighton BN1 1RG, if you would like a copy of any particular document not published in *Clean Air.*

Environmental, Economic & BPEO Assessment Principles for IPC: HMIP consultation, 6 July. (Summary in this issue of *Clean Air.*)

Technology Foresight – Energy Panel (Cabinet Office of Public Service & Science), 12 July.

DOE Discussion Paper on Annoyance. 29 July. See this issue of *Clean Air.*

DOE/WO/SOED consultation on the Monitoring and Dispersion of Emissions from Part B Processes, 19 August. See this issue of *Clean Air.*

Local Authority Smoky Diesel Action Pack.

NSCA Local Authority Guidelines on Noise Problems.

BUDGET SUBMISSIONS

Company Car Taxation

NSCA joined Transport 2000 and other environmental transport groups in a letter to the Chancellor of the Exchequer calling for quirks in the company car taxation system to be changed in the November budget. The groups pointed out that at present company motorists can cut their tax bills by around £600 a year by clocking up extra business mileage to meet tax thresholds of 2,500 miles and 18,000 miles. This encourages millions of miles of extra car travel, thus wasting ten million days of employee time, and adding to emissions of toxic pollutants from vehicles.

In their letter, the groups call for the following changes:

- company motorists to be taxed on the basis of their private mileage rather than their business mileage. This would more accurately reflect the benefit of having a company car. On average company motorists drive 5,000 more miles a year than motorists without a company car; this extra private mileage accounts for 5 per cent of all car mileage in Britain. If taxation were based on private mileage, company motorists making less private use of their cars would benefit.
- the tax system for free petrol and diesel to be changed. A simpler taxation structure, including incentives to reduce car use, should be introduced, based on car list prices instead of on engine capactiy. Free fuel is presently undertaxed by about a quarter.

Tobacco Taxation

NSCA has joined 56 other health and environmental organisations in a joint submission to the Chancellor of the Exchequer calling for increased taxation on tobacco and tobacco products. The Group believes that raising the price of tobacco is the single most effective way of reducing tobacco consumption, and thus the enormous cost both to industry and the NHS through smoking related illnesses.

In summary the Group recommends:

1. Excise duty on tobacco should be raised substantially:

- the flat rate element of excise duty on cigarettes should be raised by the maximum amount permissible under current EU directives — about 16p on the reference band.
- excise duty on other tobacco products should be increased to close the gap in terms of price per unit weight between manufactured cigarettes and other forms of tobacco (cigars, pipe and handrolling tobacco).

2. In the review of the European Union directives on tobacco taxation structures due later this year, the UK Governement should seek a regime which:

- abolishes the maximum level of specific duty;

- sets a high and rising minimum level of duty, in ECUs.
- allows Member States to impose extra taxes on cigarettes which yield high levels of nicotine, tar or carbon monoxide or have other particular features of concern and to impose differential taxation rates on regular, kingsize and super kingsize cigarettes.

3. Stringent enforcement and deterrent measures should be introduced to combat smuggling and the illegal sale of personal imports:

- tax stamps should be introduced on all packets legally sold in the UK.

4. The tax deductibility of expenditure on tobacco advertising and promotion should be abolished.

5. Rules should be re-introduced to limit withdrawals from bond in the four months prior to the Budget to no more than the average for the previous 12 months. This is in order to avoid a delay in the tobacco price increase being passed on to smokers, to limit the opportunities to offer smokers discounts on tobacco throughout the year and to stem the loss of tax revenue on the huge stocks of tobacco withdrawn from bond immediately before the Budget.

A full copy of the submission is available from NSCA.

* * *

SCOTTISH DIVISION

Two Seminars were held during June.

The first in Edinburgh covered Energy and the Environment and Environmental Assessment. During the first session speakers discussed NSCA energy policy, renewable energy sources, energy conservation and efficiency and energy from waste incineration. The second session focussed on the interface betweeen environmental assessment and pollution control. Two case studies of EA — for a wind farm and for an incinerator — were presented and the role of EA in policy and plan making were explored.

The second seminar, in Dunblane, was on Upgrading Plans for Part B Processes in Scotland and complemented a similar seminar held by NSCA in Birmingham also in June (see summer edition of *Clean Air*).

* * *

REPORTS

ASSESSMENT OF PERSONAL EXPOSURE TO AIR POLLUTION

Kevin Loth and Mike Ashmore
Centre for Environmental Technology
Imperial College of Science, Technology and Medicine

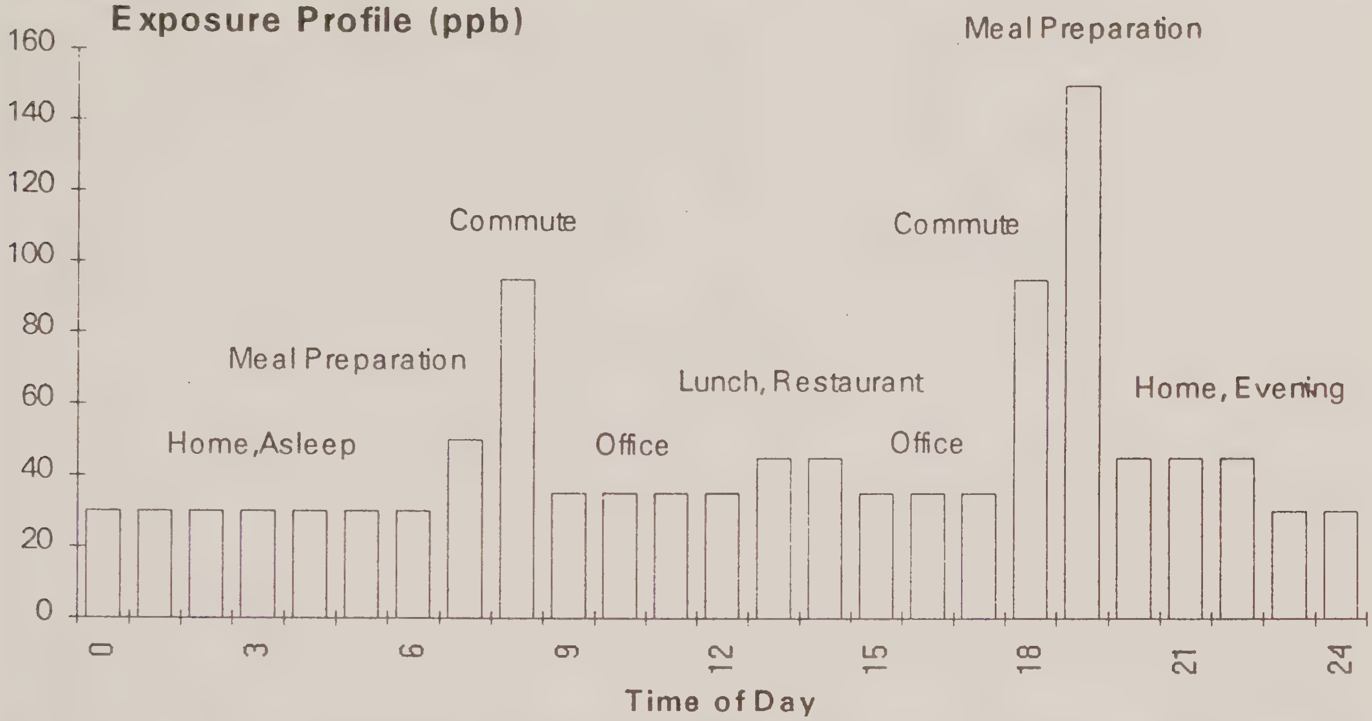
Introduction

The development of air pollution control policy requires accurate assessment of the impacts of current concentrations, and of the potential benefits of measures to reduce current emissions. In the case of human health, a key element of any such assessment is an estimate of the actual exposure of individuals to specific pollutants. However, this assessment is not straightforward. While the measurement of air pollution is usually based around the use of fixed site monitors (FSMs), the mobility of individuals means that their actual exposure will vary over the course of a day, as they move between locations such as home, street, office, car etc. For example, Figure 1 shows the variable pattern of exposure to nitrogen dioxide of a hypothetical commuter over the course of the day. The rapid changes in concentration as the individual moves from one location to another may have health significance. In the case of other pollutants, cumulative exposure, or average exposure over certain fixed time intervals, may be more important considerations.

The actual concentrations in the various locations between which this individual is moving are, of course, varying over time; also, another individual may enter or leave these locations at different times than the individual in Figure 1, and thus will experience a different concentration profile. This interaction between the spatial and temporal variation in pollutant concentration and the time-activity patterns of individual people means that almost every individual will have a unique personal exposure to air pollution. When considering air pollution control policy over a nation, region or city, it is necessary to consider the exposure of the population as a whole. In practice, because of the variation between individual members of this population, this actually means the frequency distribution of individual personal exposures within a population.

While the development of personal exposure assessment methodologies has been a key element of research in the US over the past two decades, it has received relatively little attention in the UK, or indeed in Europe as a whole. However, there is now an increased emphasis on air quality criteria in the UK regulatory context, as exemplified

Figure 1 Hypothetical Exposure Profile for Nitrogen Dioxide in an Urban Environment



by the air quality standards recently set for benzene and ozone (EPAQS, 1994a, 1994b). These standards will be the focus for the development of air pollution control policy over the next two decades. If alternative policies to reduce emissions from different sectors are to be properly evaluated in terms of their impacts on human health, it becomes essential to develop methods to assess the numbers of people in the population who currently experience exposures in exceedence of these criteria, and who would do so if certain policies were implemented. The current procedures of comparing concentrations at FSMs with these criteria, or estimating the number of people living in areas with particular pollutant concentrations, are clearly inadequate for this purpose.

The assessment of personal exposure is also of critical importance in terms of objectively assessing the relative benefits of different pollution control policies. Unless the relative importance of exposure in different locations can be evaluated, it is impossible to properly assess the implications of policies to reduce exposure in individual locations. It may be, for example, that policies to reduce ambient air pollution are less cost-effective than policies to reduce pollution arising from indoor sources. As the UK begins to promulgate air quality standards, and to develop policies to meet these standards, it is essential that the benefits of these policies for personal exposure can be properly assessed.

Key Issues in Personal Exposure Assessment

The key issues that must be addressed before effective personal exposure assessment is possible are:

i The purpose of the exposure assessment.
ii The most appropriate methodology for monitoring pollutant concentrations.

iii Sample selection and the collection of survey data.
iv Modelling methods.

It is important to clearly identify objectives when designing personal exposure assessment programmes. There is a very important distinction to be drawn between personal exposure assessment as applied in environmental epidemiology, and as applied in pollution control policy. In the former, the personal exposure assessment is associated with a specific individual on whom specific symptoms or other health outcomes have been recorded. In contrast, in policy terms, what is of interest is the frequency distribution of exposures and it is not essential to associate an individual exposure with a specific person or specific symptoms. In the policy context it is much more important that any measurements made are representative of a wider population.

Because personal exposure assessment is concerned with the exposure to a single pollutant at the level of the individual, any pollutant monitoring exercise must incorporate the spatial and temporal variables associated with both individuals and pollutants. Although a number of personal monitors are routinely used in occupational environments and may be suitable for adaptation to ambient personal exposure assessment, the choice of suitability for monitoring in ambient environments depends on different methodological constraints, and is not merely a decision based on precision and accuracy. Equally important will be practical considerations such as the weight, noise, battery life, and cost.

Sampling methods used to monitor airborne pollutants may be passive; relying on molecular diffusion to deliver the analyte to a collection medium, or active; relying on a controlled mechanical air flow to pull the analyte through a collection device. Passive devices such as the Palmes tube (Palmes, 1976) or Yanagisawa badge (Yanagisawa, 1982), used to monitor nitrogen dioxide, or sorbent tubes to monitor hydrocarbons, have the advantage of being relatively inexpensive, and tend to be unobtrusive and thus widely acceptable to study subjects. However, the long sampling time and lack of real-time data may not provide the necessary time resolution for identifying sources of peak pollutant exposure, a factor which may add considerable uncertainty in estimates later derived from personal exposure models. On the other hand active monitors, which in many cases may provide real-time data, are more expensive and more obtrusive, resulting in reduced sample size, and possible limitations to subjects' activities.

When considering methods of measuring individual pollutant exposure, an important distinction may be made between personal (direct) and microenvironmental (indirect) methods. Personal monitoring involves attaching a monitor to an individual. The microenvironmental approach involves measuring pollutant concentrations in a number of defined environments in which an individual spends time, and combining these measurements with information on the person's time-activity pattern to estimate their exposure. Both personal and semi-portable background monitors may be used to estimate pollutant concentrations in the various environments.

When assessing the exposure of populations, rather than individuals some form of exposure model is needed. Any exposure model combines two pieces of information; data on concentrations in different locations, and information on the time spent in these different locations. Within this structure, there may be other models used to estimate the concentration in the different locations; these may be crudely divided into mathematical dispersion models based on basic physical and chemical processes controlling concentrations, and statistical models, derived from observational data. The model estimates population exposure by integrating, in some form of computer model, independently collected information on time-activity patterns, location characteristics, and pollutant concentrations in the defined microenvironments.

There is evidence to suggest that the microenvironmental approach to personal exposure assessment may not accurately reflect personal exposure, especially in the case of certain pollutants. Comparisons between microenvironmental and personal monitoring of PM_{10} and VOCs indicate the assessed exposure is substantially lower using the microenvironment approach (Wallace, 1993). Microenvironmental monitoring therefore, despite being a valuable tool in the development of exposure models, cannot always be a substitute for personal monitoring. For certain pollutants, personal monitoring will be vital to the establishment of a realistic frequency distribution of population exposure.

The nature of an individual's or a population's behaviour, in terms of spatial and temporal activity patterns, is a crucial determinant of their personal exposure to air pollutants. The exposure to any one pollutant will vary markedly depending on the location, characteristics of that location, activities undertaken, time of day or season, and the actual time spent in that location. For example, to assess indoor exposure to nitrogen dioxide it may be important to establish (a) whether an individual was in the kitchen, (b) whether that kitchen had an unventilated gas cooker, (c) whether cooking was taking place, (d) whether it was winter or summer (i.e. whether windows were likely to be open or closed), and (e) how much time was spent in the kitchen. The final model used to estimate personal exposure, however detailed the pollution monitoring, will be only as accurate as the level of detail gained in terms of time-activity.

Time-activity data may be collected by direct measurement i.e. electronically recorded in real time by use of an automated data logging system, by direct observation, by the use of self-administered daily time-activity diaries, or by "snap-shot" questionnaires. Certain time-activity data such as time spent commuting to and from work, mode of transport, use of gas appliances, and smoking characteristics, are available from a number of existing public or commercial sources.

Having constructed the model, a key issue is then its validation. Essentially, the only objective basis of comparision is on an individual basis, by comparing model predictions with actual exposures measured by direct personal monitoring. These comparisons can be used to test whether there is any correlation between the exposure estimates obtained using the two methods for a group of people, and whether there is any consistent discrepancy. This approach of course assumes that the monitoring method is accurate and that any discrepancy is due to errors in the model. Few such studies exist, but in general the conclusion is that although there is often a high correlation between the two estimates of personal exposure (i.e. individuals who have a relatively high exposure predicted by the model do have a relatively high measured exposure), there can be substantial absolute differences between the two estimates. One reason for these discrepancies is that there may be bias in the selection of locations or individuals to provide input data for the model. For example, it has been suggested that US studies of CO exposure during commuting tended to concentrate on journeys using the main routes, and hence provided inputs to the model which overestimated actual exposure.

Experience of Personal Exposure Assessment

The issue of personal exposure assessment has received considerable attention in the USA over the past fifteen years. The EPA Total Exposure Methodology (TEAM) studies have focused on VOCs, carbon monoxide, pesticides and particulates (Wallace, 1993), and there have also been a number of other important studies on these and other pollutants. While there are many important differences in lifestyle and exposure patterns between the US and the UK, the findings of these studies have considerable implications for the UK.

Thus, a key finding of all of the four TEAM studies is that overall personal exposure is substantially higher than that measured outdoors. This finding was based on direct personal measurements of exposure in different microenvironments, together with time-activity based modelling when appropriate. In many cases, this was because exposure was higher indoors than outdoors, and since most individuals spend the majority of their time indoors, this is more important in determining overall personal exposure. However, in the case of the studies on VOCs and particulates, the indoor concentrations recorded by personal monitors were also higher than those measured simultaneously by fixed instruments located in the same room.

These findings have considerable implications for pollution control policy. For example, Wallace (1989) estimated that, for benzene, 50% of the population exposure is due to direct smoking, 25% is due to personal activities such as passive smoking, car driving and the use of certain consumer products, and only 15% due to direct outdoor exposure. Thus measures to reduce outdoor concentrations may have rather limited impact on population exposure, unless they are accompanied by measures to reduce other sources of exposure.

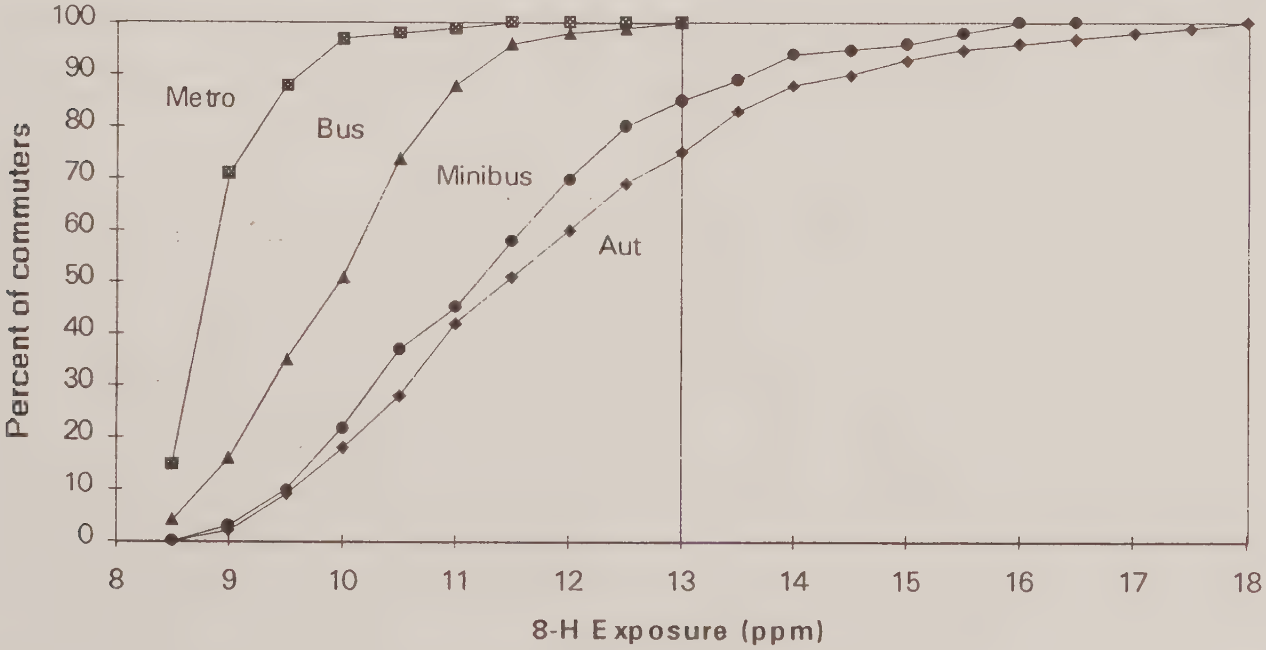
This conclusion does not apply to all pollutants. For example, ozone has very few indoor sources, and indoor concentrations are substantially lower than those outdoors; thus personal exposure is determined largely by outdoor sources. Similar conclusions apply in the case of sulphate aerosols, although in this case, penetration of fine particles indoors may be substantial. Furthermore, the averaging time of concern is significant; while annual mean personal exposure may be higher indoors than that outside, during smog episodes with high outdoor pollutant concentrations it may be the outdoor exposure which is most significant. Thus, assessment of the results of personal exposure assessment need to be placed in the context of the health effects of concern.

Another key finding of several US studies is the wide variation in exposure between individuals. For example, the frequency distribution of exposure to respirable particulates estimated in two small towns in Tennessee by Spengler et al (1985), showed that personal exposures of individuals, which were measured directly, were both higher than ambient concentrations measured at an outdoor fixed-site monitor, and also showed a much greater variability, with a small number of individuals being exposed to very high concentrations. These, and other similar findings (e.g. Letz et al, 1984) have considerable implications for the interpretation of recent studies of the association between particulate exposure and morbidity and mortality (e.g. Dockery et al, 1993), in that they imply that the actual exposure of individuals to respirable particulates was considerably higher than the outdoor concentrations used in the epidemiological analysis.

In the case of carbon monoxide, more complex time-activity models have been used to estimate short-term exposures on a population basis. Models such as the Simulated Human Exposure (SHAPE) model (Ott, 1984) provide estimated 1h and 8h exposures based on a combination of input variables, including actual or simulated time-activity patterns, microenvironment CO concentrations expressed relative to those at an outdoor urban background fixed-site monitor, and time-series data from that fixed site monitor. By expressing CO exposure indoors, in-vehicles etc, relative to those outdoors, and by randomly selecting from a range of time-activity patterns, it is possible to generate a frequency distribution of exposures within a population.

US studies of personal exposure to CO have suggested that the most important element of exposure is that within vehicles; this may be also an important source of exposure to other pollutants, such as benzene and other VOCs (Chan et al, 1991). Figure 2 illustrates the frequency distribution of exposures to CO for commuters in Mexico City, where commuting times are long, and ambient CO concentrations are rather high (Fernandez-Bremauntz, 1993). This clearly shows the way in which this type of model can be used to evaluate on a population basis the effect of different transport modes, and illustrates that a switch from private cars to metro could have benefits in terms of reducing personal exposure to CO aside from those related to overall emission levels. Hence the efficacy of different air pollution control options should be considered in terms of their impact on personal exposure, as well as that on emissions or outdoor concentrations.

Figure 2 Cumulative Frequency Distribution of 8-h CO Exposures of Commuters in Mexico City (Fernadez-Bremauntz, 1993).



These examples drawn primarily from the US have illustrated the importance of developing methods which allow individual human exposure, or population exposures, to air pollutants to be assessed. The results clearly show that very different perspectives can be gained, and that concentrating on specific types of environment, whether indoors, outdoors or elsewhere, is an inadequate basis for almost all pollutants on which to assess personal exposure and thus potential health effects. While the details of exposure patterns in the UK will undoubtedly differ from those in North America, there is little doubt that the general conclusion that outdoor fixed-site monitors provide a poor basis for assessing human exposure to air pollutants will remain valid.

Assessment of the UK Position

To date there has been no population based personal exposure assessment work conducted in the UK. While the ability to begin deriving estimates varies considerably depending on the pollutant, there is a body of UK information on both pollutant concentrations and time-activity patterns which may be relevant for use in personal exposure assessment. However, this needs to be assembled and integrated in a coherent way in order to develop the estimates of population-based personal exposure required.

There has been a considerable amount of personal exposure work conducted in the US and elsewhere on carbon monoxide. The methodologies and monitoring equipment could be readily adopted for use in the UK if required. However this is likely to only be necessary for targeted populations such as street vendors, or targeted microenvironments such as in-vehicles, where specific concerns may arise. Rather than devote research effort to a comprehensive assessment exercise in the UK, there may be a case for some preliminary work in such high-risk situations to evaluate whether these give cause for concern.

Very little work on personal exposure to VOCs, and in particular benzene, has been conducted in the UK. There is a gap in knowledge of benzene exposure in UK vehicles, in UK homes and in certain microenvironments such as petrol stations. However, some data is available, and this, together with census and household panel time-activity data, could be used to form the basis of some crude initial predictions of personal exposure from different sources. These predictions could then be used to focus monitoring activity.

In the case of nitrogen dioxide, the key indoor and outdoor microenvironments of importance in the UK are well established, and a considerable amount of relevant data on concentrations in these key microenvironments have been collected (e.g. Melia et al, 1990; Stevenson et al, 1993). There is also a number of epidemiological studies currently being undertaken to estimate personal exposure to nitrogen dioxide in distinct populations. However, these estimates, derived using passive diffusion tubes, provide long time-weighted averages of exposure and do not allow short peaks in concentrations to be detected. Recent development in semiconductor monitoring techniques mean real time exposure monitoring may now be feasible. Current monitoring data needs proper collation, and additional time-activity data is required if population based exposures are to be determined.

The overwhelming majority of exposure to ozone (O_3) is likely to be in outdoor environments. Because O_3 is favoured by hot sunny weather, there are considerable seasonal and daily variations in ambient concentrations in the UK. There has been no time-activity data collected in the UK that is likely to be sufficient to predict the amount of time populations spend in the important outdoor microenvironments in terms of O_3 exposure. Time-activity data focusing on outdoor environments on sunny summer days is particularly important in terms of assessing personal exposure to O_3. Although some additional background monitoring is required, especially in suburban areas where little is known about O_3 concentrations, there is a rural O_3 monitoring network in the UK, and once data on time-activity patterns were available, it would be relatively easy to provide time-resolved estimates of personal exposure within certain populations.

In the case of particulates very little information is available with regards to the important microenvironments involved in personal exposure. Because PM_{10} is not species specific, but merely refers to a size of particulate matter, there are a huge array of potential sources, both indoors and outdoors. A coordinated research strategy involving microenvironmental and personal exposure monitoring as well as improved background ambient monitoring and time-activity data collection, is required before a model of personal exposure to PM_{10} can be attempted. At present there is not sufficient UK information on which to base any estimate of exposure, without recourse to data from the US and elsewhere overseas. These data cannot necessarily be transposed to the UK because of the large differences in lifestyle.

Summary

This paper has summarised the reasons why personal exposure assessment is important, and indeed why it is the only basis on which the health effects of air pollutants on populations can properly be assessed. In many cases, personal exposures have been found to be greater than concentrations measured at fixed site monitoring stations. The results of personal exposure assessment have often provided new thoughts into the importance of different sources of exposure, which are significant in terms of developing effective control strategies. Many of the tools, and in many cases the data, are now available to begin to properly assess the personal exposure of the UK population.

Acknowledgement

We acknowledge the financial support of the Department of the Environment and the personal support of Dr. Martin Williams.

References

Chan C., Spengler J., Ozkaynak H., and Lefkopoulou M., (1991). Commuter exposures to VOCs in Boston, Massachusetts. J. Air Waste Manage. Assoc., 41, 1594-1600.

Dockery D.W., Pope C.A., Xu X., Spengler J.D., Ware J.H., Fay M.E., Ferris B.G. and Speizer F.E. (1993). An association between air pollution and mortality in six U.S. cities. New England Journal of Medicine, 329, 1753-1759.

EPAQS (1994a). Benzene. First Report of DoE Expert Panel on Air Quality Standards. HMSO, London.

EPAQS (1994b). Ozone. Second Report of DoE Expert Panel on Air Quality Standards. HMSO, London.

Fernandez-Bremauntz A.A., (1993) Commuters' Exposure to Carbon Monoxide in the Metropolitan Area of Mexico City. Centre for Environmental Technology. PhD Thesis Imperial College of Science, Technology and Medicine. London.

Letz R., Ryan P.B. & Spengler J.D. (1984). Estimated distributions of personal exposure to respirable particles. Environ. Monitoring Assessment, 4, 351-359.

Melia R.J.W., Chinn S., and Rona R.J., (1990). Indoor levels of NO_2 associated with gas cookers and kerosene heaters in inner city areas of England. Atmospheric Environment. Vol 24b, (1), 177-180.

Ott W.R. (1984). Exposure estimates based on computer generated activity patterns. J. Toxicol.-Clin. Toxicol., 21, 97-128.

Palmes E.D., Gunnison A.F., Dimattio J., and Tomezyk C., (1976) Personal sampler for nitrogen dioxide. Am. Ind. Hyg. Assoc. J. 37, 570-577.

Spengler J.D., Treltman R.D., Tosteson T.D., Mage D. & Socrek M.L. (1985). Personal exposures to respirable particulates and implications for air pollution epidemiology. Environ Sci. Technol., 19, 700-707.

Stevenson K., Baily J., Mark D., Sweeney B., Griffiths D., and Rothwell G. (1993). A study of air quality in homes for Middlesbrough Borough Council. Report No. CR3782. Warren Spring Laboratory, Stevenage.

Wallace L.A. (1989). Major sources of benzene exposure. Environ. Health Perspectives, 82, 165-169.

Wallace L. (1993). A decade of studies of human exposure: what have we learned? Risk Analysis, 13, 135-139.

Yanagisawa Y., and Nishimura H., (1982). A badge-type personal sampler for measurement of personal exposure to NO_2 in ambient air. Environment International, 8, 235-242.

1995 Edition
NSCA POLLUTION HANDBOOK

Available February 1995

A5, c500 pages, soft covers, ISBN 0 903474 37 9
Price: £23.95 inclusive of postage and packing

PLANNING POLICY GUIDANCE (PPG) 13
TRANSPORT

Simon Hickmott
Group Manager
Environmental Services Group
East Sussex County Council

Introduction

Planning Policy Guidance notes (PPGs) are a series of advice from the Secretary of State for the Environment to planning authorities. PPGs are not law but have great weight in influencing the operation of the planning system, especially as they will be foremost in the minds of the Planning Inspectorate when considering draft development plans or planning appeals (when planning authorities have refused or not determined planning permission). The DoE has commissioned research into the effectiveness of PPGs.

The Draft Planning Policy Guidance note on Transport replaced the 1988 version of PPG13, *Highways Considerations in Development Control.* The new note updates and broadens earlier advice in the light of new policy imperatives and the current, higher status of Development Plans[1]. The final versions of two other PPGs which are of particular interest to NSCA members – *Planning and Pollution Control* and *Noise* have also been published recently – PPG23 and PPG24 respectively.

Research

PPG13 draws on the findings of a research report "Reducing Transport Emissions Through Planning", prepared for the Departments of Environment and Transport and Ecotec Research and Consulting, in association with Transportation Planning Associates[2]. The research addresses the role of land use planning in reducing the need to travel and encouraging use of means of transport other than the car, the interactions between land use planning and transport planning, and the importance of co-ordination and other transport considerations in Development Plans and development control.

One important caveat is that much of the analysis set out in this report is based on the National Travel Surveys which only count journeys of >1.6km, thus under-counting walking and cycling trips.

Amongst other things, the study simulated the traffic generation which would result from different development patterns following growth in employment and population:

1. focusing growth at high density in the existing central area;
2. focusing growth along an existing major radial route; and

3. a more dispersed, lower density pattern of growth at the periphery of the area which is served by a major orbital road as well as two radial routes.

The study found the least traffic distance and fuel use increase with pattern 1 and most with 3, but little difference between patterns 1 and 2. Congestion damped the advantages of increased urban densities. This and other studies estimate that land use planning could lead to c.15% savings in passenger transport fuel use over a 20-25 year period.

Analysis of the National Travel Survey for 1985/86 shows that there is a great increase in the propensity to travel by car by those living in settlements of less than 25,000 in population.

Principles

The introduction of PPG13[3] emphasises the important interactions between transport and land use, and the overall objective of sustainable development. It sets out the serious environmental challenge from transport: *"Traffic growth on the scale projected could threaten our ability to meet objectives for greenhouse gas emissions, for air quality, and for the protection of landscape and habitats". (1.1).*

The Government looks to all tiers of the planning system to deliver its aims: regional planning guidance, structure plans (or Part I of Unitary Development Plans in metropolitan areas), and local plans (or Part II of UDPs). They are all asked to:

- examine the relationships between transport and land use planning;
- promote their integration and co-ordination; and
- promote strategies to reduce the need to travel.

The Government finds it necessary to remind local authorities that having made these plans, they should stick to them: *"Well-considered locational policies in plans, designed to reduce the need for travel, can be undermined by development control decisions which fail to reflect these policies".* (2.12).

The guidance is clear on the key duty of a planning authority: *"Local planning authorities should consider carefully the impacts on travel demand of all new development before planning permission is granted".* (2.12).

The new approach can wipe the slate clean where planning permissions are now out of time (5 years), so having granted permission on a site once before need not be a constraint today: *"Local authorities should consider the implications of new or emerging plan policies designed to reduce the need to travel when considering the appropriateness of renewing unimplemented planning permssions".* (2.13).

Guidance is stronger on cycling: *"The 'proposals map' (detailed Ordnance Survey base for local plans or UDP Part IIs) should indicate routes along which measures will be encouraged to make cycling safer and more attractive. . ."* (4.15), and that *"Provision of secure cycle parking facilities should be sought in all major developments and in town centres, and at educational institutions".* (4.17). The latter being a challenge for any designer — what is a **secure** cycle facility these days?

In line with the Society's comments on the draft PPG, health is raised as a linked issue, by reference to the positive benefits of walking and cycling, but the effects of emissions and noise on health are not considered.

Transport Infrastructure

Planning policies are linked to one key method of implementation as annual bids to the Department of Transport for Exchequer funds – Transport Policies and Programmes *"...should flow directly from development plan policies, and should be cross-referenced to them".* (5.5). One particular curse of the 1970s and 1980s is also reversed: *"Authorities should ensure that disused transport routes, such as old canals and railways, are not unnecessarily severed by new buildings. . .as well as their original uses, such routes may serve as cycle routes, pedestrian paths or bridleways".* (5.8).

Transport Priorities and Access

PPG13 then throws up a conundrum for planners. Here (6.1) they are advised to help the free flow of traffic, although they were earlier encouraged to increase the density of development along routes which could be well served by public transport (3.3): *"Plans should aim to reduce the need to use trunk roads and other through routes for short local journeys. They should identify those routes (which should include all trunk roads – except those serving central urban areas) which are reserved as corridors for movement where associated development will be resisted".* (6.3).

Is It A Significant Change?

There are a few good general points set out in PPG13 and a lot of nuggets in the detail, but although the new guidance does change the arena for debate – previously planners were not charged with reducing the need to travel, it does not go far enough to set out and meet the scale of the environmental challenge from traffic.

The stricture that planning authorities should promote strategies to reduce the need to travel and consider the impacts on travel demand of **all** new development are significant milestones. The advice to avoid the incremental expansion of small settlements, where this is likely to result in car commuting, is also a sea change. However, it may well be interpreted by some as a 'death to villages' policy and if taken up by planning authorities will prove very controversial. PPG13 also drops the strong theme in earlier advice of reducing congestion. This could never be achieved – if some vehicles are left at home others will replace them, congestion will find its own level as people perceive the alternatives to be better or worse. It was anyway often a good thing, although it may increase fuel use per journey it certainly deters many journeys, slows down vehicle speed and reduces the seriousness of accidents.

Will It Work?

There are two important caveats to an assessment of whether any PPG can deliver the scale of change needed. First, changes to the stock of buildings is very slow, and even if there is redevelopment it is very rare indeed for a site to be 'unbuilt' – certainly the worst excesses of the 1980s out-of-town stores and offices are not likely to be returned to open land in the next twenty years. Second, personal behaviour will ruin the best laid plans – it may be accessible by public transport but people will choose to go by car instead. Indeed, the Ecotec study (above) estimated that better planning could only contribute c.15% saving in passenger transport fuel consumption over a 20-25 year period, but not commuting to work one day in five could deliver the same level in a week.

However, PPG13 will encourage some better broad planning decisions, such as to decide to generally redevelop town centres before allowing more peripheral estates. At the detailed level, we probably do not know enough to get the decision right on all occasions and closer study may well lead to counter-intuitive policies. For example, there may be times when it would be more sustainable, at least in terms of transport and fuel use, to keep an open space undeveloped or turn the footprint of a derelict building into a small park, especially where open space is the key local factor in encouraging people to return or remain living in a city centre.

As outlined above, the real challenge for guidance is how it fares in the arena of a public inquiry. PPG13 is a start but when faced with a barrister representing a house building organisation asking what sort of development would not be, in the terms of the guidance, *"capable of being well served by rail or other public transport"*, and whilst remembering other advice that it is not the function of the planning system to make commercial judgements and reflecting on the common experience that a low-cost minibus service could quite easily serve a low-density estate, it is suggested that something a little more substantial than the principles of PPG13 would be needed to defend a new policy based on it.

Planning authorities will therefore need to commission detailed studies in their area, for example, to examine the relationship between the location and density of development, and traffic movement and transport fuel use. For example, at a local level (apart from the very useful London Travel Survey), we commonly do not know why people travel where they do, let alone what would persuade them not to.

The guidance fails by not setting out the dimensions of environmental factors, such as:

- transport's share of fuel use, air quality emissions, noise and visual disturbance;
- national targets for each element of the problem — it does not even repeat the Government's CO_2 target, and although the White Paper *Health of the Nation* gets a mention, the targets for the reduction of NOx levels in urban areas which appeared in the draft White Paper do not;
- not raising air quality in detail, for example there is no mention of air quality standards, a serious omission given the scale of emissions from road transport.

The new PPG on planning and pollution control is an opportunity to rectify these omissions.

The guidance then adds detail to these principles addressing the location of development, complementary transport measures, transport infrastructure, and transport priorities and access to developments.

Location

On the location of housing development, planning authorities are advised to:

- allocate the maximum amount of new housing land to accessible locations in existing larger urban areas;
- where this is not possible, promote housing development in locations "capable of being well served by rail or other public transport". (3.2):
- avoid any significant incremental expansion of small settlements where this is likely to result largely in car commuting to urban centres and where travel needs are unlikely to be well served by public transport;
- avoid the development of small new settlements which are not likely to be well served by public transport or which will not be largely self-contained *"broadly those unlikely to reach 10,000 dwellings within 20 years"*;
- providing for higher density residential development at or near public transport nodes or within corridors capable of being well served by public transport;
- set standards to maintain or increase existing densities;
- juxtapose employment and residential uses.

A similar thread runs through advice for commercial development. The guidance is to balance housing provision and the supply of workspace, and concentrate travel intensive uses such as offices in urban areas. A significant shift in policy is the advice to *"allocate sites unlikely to be served by public transport solely for uses which are not employment - or travel-intensive"* and to reallocate accessible land which has been written down for less intensive uses. Previously the Government discouraged planners from distinguishing between commercial uses — the market was to decide whether office blocks in fields were appropriate uses.

General, common-sense encouragement also returns to the planning of freight and leisure facilities. The trend of the 1980s to allow the loss of wharfs and railyards for aggregates, is now tackled by guidance to keep them. The edge-of-town multi-screen may also become a 1980s relic as planners are asked to provide town centre locations for cinemas and theatres.

Complementary Transport Measures

Complementary measures include the specific advice that: *"it is for example unlikely to be appropriate in future for developments to be provided with as many car parking spaces as there are employees"* (4.5). Parking requirements should be kept to the *"operational minimum"* — this will provide fertile ground for debate between developers and planning officers. The guidance also queries, but does nothing stronger, a long practice amongst local authorities of asking for 'commuted payments' for the supply of parking elsewhere when it cannot be provided on a site, raising the question of whether it might not be better to put this payment towards public transport, walking or cycling instead.

References

1. As a first principle, development which requires planning permission must now be in accordance with development plans unless all other considerations outweigh this (e.g. local conditions of a particular site may

be so unusual as to warrant setting aside the provisions of the development plan). Before s.54a of the amended 1990 Town and Country Planning Act, development plans were merely one of a number of "material" considerations.

2. HMSO, London. ISBN 0 11 752785 8.

3. PPG13, Planning Policy Guidance: Transport. Department of the Environment/Department of Transport, 1994, HMSO.

UPDATE

ENVIRONMENTAL NOISE BUYING STANDARD

Complaints from nearby residents about noise from industrial sites have been growing rapidly over the last few years. Apart from the bad publicity that they can generate, a Noise Abatement Notice under the *Environmental Protection Act* can result in a fine of £20,000 plus £500/day for non-compliance. Moreover, environmental noise targets based on ratings established under BS4142 are often mandatory conditions for planning consent on new facilities or installations; conditions attached to authorisations under Part I of the EPA for Part A processes may also include noise emission limits. Whilst the costs involved in meeting environmental noise targets can be very considerable, they can be reduced substantially by forward planning and the application of a set of practical guidelines.

The NSCA's National Noise Committee has recently given its support to the Industrial Noise & Vibration Centre's (INVC) proposal for a standard which could be applied to the purchase of new plant and equipment or re-siting existing equipment where it is possible that the equipment might generate significant noise levels. The standard involves a systematic approach, which includes the following steps:

- Noise Specifications for suppliers of new plant: a simple step-by-step procedure to allow a noise specification to be generated for any circumstance to ensure that environmental or planning consent targets are met.
- Management Procedures: practical procedures to establish and maintain satisfactory site boundary noise levels from both new and existing plant.
- Noise Control Techniques: practical advice and techniques that can be used to minimise the cost of noise control.

- Guidance Notes and Software: a user guide providing background information about legislation, standards and a glossary of terms. The software is a set of user friendly utilities that automate some of the calculations to facilitate specification on large or complex installations. It features drop-down menus, context sensitive help, export of values as a spreadsheet and includes the following elements:

  —the effect of barriers for entered geometries and octave band source spectrum can be calculated. Programme generates receiver spectrum (linear and "A" weighted) and overall levels. Graphical display of all parameters is available.

  —automatic calculation of distance attenuation (point or line source) from entered distances from source and receiver.

  —add or subtract up to 10 dB values automatically.

  —automatic calculation of BS4142 rating and likelihood of complaints.

Where necessary companies should seek expert help to implement the Standard, train company engineers and carry out initial noise assessments and measurements. Technical support may also be required when dealing with suppliers and for the development of solutions to noise control problems. This type of support can be obtained from some specialist noise consultants.

For more details, including cost, contact the INVC at Burnham House, 267 Farnham Road, Slough, Berkshire SL2 1HA.

EU AIR QUALITY FRAMEWORK DIRECTIVE

The long-awaited proposal for a Directive on ambient air quality assessment and management (COM[94] 109) has finally been published by the European Commission. A main aim of the Directive is to protect human health and the environment; this will be achieved through

- fixing objectives for air quality limit values and alert thresholds;
- assessing air quality in a uniform manner;
- making information available to the public;
- maintaining or improving ambient air quality.

Continuous improvement of air quality will be required to reach specified long term limit values (LTLV), which must be achieved within 10-15 years of the Directive entering into force; the Directive also raises the possibility of setting interim current permitted values (CPV) which incorporate a margin of exceedance and which decreases with time. The public would have to be informed when alert thresholds were breached.

Member states would be required to classify areas according to three criteria:

- **area of poor air quality:** where AQ exceeds CPV, measures and programmes must aim to achieve CPV as soon as possible and to achieve LTLV in a specified time limit;
- **area of improving air quality:** where AQ is between CPV and LTLV, no increase allowed and LTLV to be achieved within a specified time limit;
- **area of good air quality:** no action required where AQ is under LTLV.

Criteria for monitoring, modelling and estimation techniques will be fixed for individual pollutants. Member States must designate the national, regional or local authorities to be responsible for implementation of the Directive and also accredit laboratories for quality assurance and assessment.

"Acts" under the Directive will set air quality objectives, limit values, alert thresholds, guidance on monitoring siting and measurement methods. Pollutants covered by existing Directives (sulphur dioxide and black smoke, including suspended particulate matter, nitrogen dioxide, lead and ozone) are to be dealt with by 31 December 1996, when the current Directives would cease to apply. The aim is to deal with a second list of pollutants by 31 December 1999 (carbon monoxide, cadmium, acid deposition, benzene, polyaromatic hydrocarbons, arsenic, fluoride and nickel). Other substances may be added to the list on the basis of new scientific evidence on environmental or health effects.

The framework Directive will also deal with monitoring programmes and networks and reporting; more detailed monitoring requirements for specific pollutants would be included in the relevant Directive.

ENVIRONMENT AGENCY

It is now expected that a Bill establishing environment agencies for England and Wales and Scotland will be included in the forthcoming Parliamentary Session.

The Department of Environment is now consulting on five options for the geographical and management structure of the Agency in England and Wales. In summary, these are:

- **Model A** – the NRA, HMIP and waste organisations would contine to run in parallel, but with a new regional and national structure for waste; integration would be through joint input in planning and policy at national level and regional (and sub-regional cooperation).
- **Model B** separates the operational and regulatory functions of the Agency, establishing a large HQ with a policy division responsible for environmental quality, and three "field" divisions for regulation, flood defence and river basin management. Multi-media teams would work to regional managers with central services centre of excellence. The module proposes seven regions, based on LA political boundaries.
- **Model C** proposes a small HQ with one policy setting directorate, an operations directorate, an environmental management directorate, an environmental regulation directorate, and two support directorates. Environmental management at regional level would deal with planning functions to achieve regional strategies and area managers would ensure local resolution of issues, with national and regional support as well as offering a "one stop" shop for customers. It proposes eight regions based on river catchments, multi-disciplinary managers with multi-media teams; and co-located staff with shared suppport resources.
- **Model D** proposes separation of regulatory and operational functions, with the former arranged on the basis of local authority boundaries and the latter on river catch-

ments. HMIP, NRA and waste regulation staff would be co-located at regional level but work in separate teams under separate managers. In the longer term, a more integrated structure would be aimed for.

- **Model E** separates operational and regulatory functions at regional (based on river catchments) and area level but brings them together at Head Office level. It proposes multi-skilled industry-facing (rather than media-facing) teams, perhaps based on the accepted Standard Industry Codes – e.g. agriculture, energy and water supply industries – backed up by staff with technical expertise in air, water and waste.

NSCA is currently consulting its members as to their preferred model for the Agency – our views will be included in the Winter 1994 edition of *Clean Air.*

EUROPEAN ENVIRONMENT AGENCY

Sr. Domingo Jimenez-Beltran, formerly Director General of Environmental Protection at the Spanish Environment Ministry has been appointed Executive Director of the European Environment Agency. His appointment runs initially for five years and as well as the day to day running of the Agency, he will be responsible for drafting its work programmes.

The Agency's Management Board (consisting of one representative from each EU Member State, two from the European Commission and two scientists appointed by the European Parliament, is the Agency's main decision making body as well as agreeing on its work programme and setting its budget. The UK's representative is Derek Osborn (Director General of Environmental Protection Group, DOE), with Hilary Hillier (Head, Environmental Protection Statistics Division) as his alternate.

Initial priority work areas are: atmospheric emissions; ambient air quality; marine and freshwater quality; soil quality; habitats and species; waste; and multi-media issues.

As the EEA will have a relatively small core staff, each Member State is designating "national information networks" consisting of organisations who collect a wide range of environmental data on a regular basis, and "topic centres" who will be contracted to carry out projects on behalf of the EEA. The work of the information networks and topic centres will be coordinated by a National Focal Point, which will also act as a point of contact between the EEA and network members. The UK's National Focal Point is based at DOE's Environmental Protection Statistics Division (Room A104, Romney House, 43 Marsham Street, London SW1P 3PY). The UK's National Focal Point is producing a regular Newsletter – for details contact Jock Martin on 071-276 8949 or Sue Brown on 071-276 8260.

The address of the European Environment Agency is 6 Kongens Nytorv, 1050 Copenhagen, Denmark.

ENVIRONMENTAL TECHNOLOGY BEST PRACTICE PROGRAMME

The Departments of Environment and Trade & Industry have recently launched the *Environmental Technology Best Practice Programme.* This takes the place of the service previously provided by Warren Spring Laboratory, including the Environmental Helpline which offers companies operating prescribed processes up to two hours free advice on technical, legal and other requirements — Tel: 0800 585794.

The main purpose of the Programme is to promote better environmental performance and to increase the competitiveness of UK industry and commerce through waste minimisation and cost-effective cleaner technology and the promotion of best practice guides. Companies can apply to participate in projects measuring and evaluating use of established or new applications of cleaner technologies or waste minimisation (good practice and new practice case studies) and future practice projects. For more information about the Programme contact the Environmental Helpline, telephone number above.

CHIMNEY HEIGHT CALCULATION

Advice for local authorities on chimney height calculation and the dispersion of emissions in relation to Part B processes, formerly provided by Dr. David Hall at WSL is now being provided by him from his new base at the Building Research Establishment; address: Environmental Systems Division, BRE, Garston, Watford, Herts WD2 7JR; Tel: 0923 664713; Fax: 0923 664095.

EPA APPLICATIONS, APPEALS & REGISTERS REVIEW

The DOE has issued a consultation paper reviewing those sections of the above 1991 Regulations dealing with applying for an authorisation, appeals against a decision of the enforcing authority and public access to information.

The main aim of the review is to invite comments on suggestions for simplifying the administrative process, enhancing transparency of both the IPC and LAAPC systems and of public access to information.

Comments were required by 19 October — NSCA's response will be included in the winter edition of *Clean Air*.

TECHNICAL TWINNING — POLAND

Scunthorpe BC has agreed a technical twinning arrangement with Ostrowiec, a steel town in Poland. This has already involved two working visits by officers from both municipalities with mutual interests in atmospheric pollution monitoring. Scunthorpe BC has been able to offer technical assistance and facilitate grant assistance from the Overseas Development Administration to fund the purchase of equipment to monitor smoke, SO_2, NOx, background radiation, radon and heavy metals.

VOLATILE ORGANIC COMPOUNDS

The House of Commons Environment Committee is carrying out an inquiry into VOCs, and have invited evidence on

— the environmental and human health effects, direct and indirect, of current and projected levels of VOC emissions;

— the adequacy and implementation of statutory controls over — and international agreements concerning — the discharge of VOCs into the atmosphere, indoors, and into surface and groundwater, and into soil;

— technological, regulatory and

economic options for achievement of further reductions in VOC emissions;

- the consequences for industry of possible controls on industrial processes; and
- the methodology, quality and frequency of measurements, including availability of laboratory facilities and of trained personnel.

NSCA's response will be included in the Winter 1994 edition of *Clean Air.*

ENVIRONMENT TRAINING

The University of Bath has developed a modular MSc course in Integrated Environmental Management (IEM) by distance learning, thus allowing people to train while still working and gain a recognised qualification with no loss of salary.

The MSc focuses on both the managerial and technical aspects of IEM and is targeted at engineers, scientists, managers, economists and lawyers with environmental responsibilities. The managerial side covers the following: environmental auditing, impact assessment, and cost benefit analysis. On the technical side, life cycle assessment, energy management and clean technology are covered. Case studies specific to certain industries are being produced for each module. Participants can tailor the course to their own requirements — modules can be studied individually as Continuing Professional Development (CPD) or taken as part of the MSc.

The course is being launched in November. For more details contact Marie Fraser at the Centre for Continuing Education, Universtiy of Bath, tel: 0225 826452; fax: 0225 826849.

AIR QUALITY IN BATH

Bath City's fourth annual air quality report (1993) shows that once again road vehicle emissions represent the major threat to the City's air quality over the next decade.

In March 1994, the Council completed its domestic smoke control programme, thus achieving its aim of reducing smoke and sulphur dioxide emissions from industrial and domestic premises to the practicable minimum.

Full details of Bath City's air quality monitoring programme and results are contained in *Air Quality in Bath, 1993,* £10.00. Available from Bath City Council (attention Mrs. I. Elliott, Environmental Health Section), Trimbridge House, Trim Street, Bath BA1 2DP.

BOOKS AND REPORTS

THE GREENING OF MACHIAVELLI – THE EVOLUTION OF INTERNATIONAL ENVIRONMENTAL POLITICS

Tony Brenton Earthscan/Royal Institute of International Affairs (London, 1994), £14.95 paperback/£29.95 hardback – ISBN 1-5383-211-1.

Tony Brenton is an experienced diplomat who worked on international environmental affairs in the European Community and the British Foreign Office between 1986 and 1992. During this time, he travelled the road from acid rain, through the ozone layer, to global climate change, taking in such picturesque detours as the North Sea, Chernobyl and global deforestation. The journey ended with the Rio 'Earth Summit' after which he took a sabbatical at the Harvard Institute for International Affairs to reflect on his travels. His conclusion is 'that the way forward may lie less in ambitious new international rules and agencies than in the fast-growing practice of bringing home to individuals and individual countries the congruence between their private interest and the wider environmental good'.

The 271 pages which lead him to his conclusion are an estimable work of scholarship which everyone with an interest in placing our quest for sustainability in a global perspective should assimilate.

WORLDWIDE LIMITS FOR TOXIC AND HAZARDOUS CHEMICALS IN AIR WATER AND SOIL

M. Sittig, Noyes. 1994. US $98. ISBN 0815513445.

The book summarises limits for over 1100 chemicals, including pesticides, in workplace air, ambient air, water and soils. It includes data from US states and 25 other countries and organisations – including the EC and WHO.

GLOBAL WARMING – THE COMPLETE BRIEFING

J. Houghton, Lion. 1994. £12.99, ISBN 073240844.

The book examines in detail the theory of global warming and provides an illustrated analysis of the consequences of current trends in pollution. It questions the sustainability of our current standard of living, and examines our responsibilities for conserving world resources.

A BRIEF HISTORY OF POLLUTION

A. Markham, Earthscan, 1994. £9.95. ISBN 1853832138.

The book tells the story of pollution from pre history to the post industrial age. It looks at the rise of the consumer society that is behind current problems and the resultatnt growth in environmental activism.

ENVIRONMENT RELATED PERFORMANCE MEASUREMENT IN BUSINESS

From Emissions to Profit and Sustainability

P. James, M. Bennett. PA Consulting Group, 1994. £25.00.

This report examines the growing contemporary pressure from regulators, environmentalists and stakeholders for companies to measure their environmental performance. It identifies a range of measures already being implemented by companies, and develops frameworks for categorising these, relating them to strategic business objectives and implementing them within organisations.

ENVIRONMENT AND BUSINESS IN SCHOOLS

Guidelines for businesses on preparing environmental education resources for schools

CBI, Members £2.50, non members £5.00, 1994. ISBN 085201394.

These guidelines are intended to help businesses maximise the potential of their educational work. They outline the basic steps in .working with schools on environmental education and provide information for businesses who wish to develop partnerships with the education sector.

NOISE AND THE LAW

A Practical Approach

M.S. Adams, F. McManus, Wiley Chancery Law, 1994. £19.95, ISBN 0471937088.

A combination of science and law, the book covers all aspects of noise. It gives comprehensive explanations of sound, hearing and noise measurement. The sources of noise and noise legislation are also explained. It offers a practical and accessible approach to a complex subject.

TOXIC SUBSTANCES IN THE ENVIRONMENT

B.M. Francis, John Wiley, 1994. £41.50, ISBN 0471507814.

In this book case studies are used to illustrate the hazards associated with toxic substances in the environment, preventing and cleaning up contamination. It looks at toxicology in the context of different environmental systems and policy and risk assessment.

CAR SHARING IN LEICESTER AND THE UK

A Review of Practice, Attitudes and Potential

A. Darlow et al, Environ, £7.50. 1994.

This report contains the results of a survey carried out into the effectiveness of, and public attitudes to, car sharing schemes operating in the UK. It concludes that formal car share schemes are unlikely to attract large numbers, but that the promotion of formal schemes encourages informal sharing between families, friends and colleagues.

CLIMATE-BIOSPHERE INTERACTIONS
Biogenic Emissions and Environmental Effects of Climate Change

Ed. R.G. Zepp, 1994. £91.00. ISBN 0471589322.

The book is a collaboration between scientists in a range of disciplines, addressing the questions of global and regional warming, its effect on natural and agricultural ecosystems and the contribution of human activities to this effect.

GLOBAL CHANGES IN THE PERSPECTIVE OF THE PAST

Ed. J.A. Eddy, H. Oeschger, John Wiley 1994. £80.00. ISBN 0471936030.

The volume contains papers from a workshop convened to discuss the future evolution of the climate in the context of paleoclimatic data.

THE ENVIRONMENTAL IMPACT OF RAILWAYS

T.G. Carpenter, John Wiley, 1994. £45.00. ISBN 0852933445.

This book brings together the main planning and management issues concerning the impact of railways on the environment. It provides a step by step assessment of how railway development should be approached in order to take into account environmental and regulatory frameworks.

AIR POLLUTION AND CLIMATE CHANGE
The Biological Impact

A. Wellburn, Longman, £17.99, 1994. ISBN 058209285.

Chapters are arranged in three parts, beginning with an outline of the physical events that create and modify pollutants and an examination of the impact of pollution on plant and animal life forms. Suitable for undergraduate and graduate students of biological, toxicological and environmental sciences.

DOMESTIC ENERGY AND AFFORDABLE WARMTH

Ed. T.A. Markus, E & F Spon, 1994. ISBN 0419200908.

The report of a working group set up by the Watt Committee to examine issues relating to domestic energy use. It reviews studies undertaken over the last twenty years and defines the difficulties and possible strategies for providing affordable warmth for those living on low incomes.

GLOBAL CONSTRUCTION AND THE ENVIRONMENT
Strategies and Opportunities

F. Moavenzadeh, John Wiley, 1994. £39.95, ISBN 0471012890.

The book covers major trends and legislation that affect construction, including discussion of the most important environmental construction issues, policies and regulations, new techniques and technologies.

INTERPRETING THE PRECAUTIONARY PRINCIPLE

Ed. T. O'Riordan, J. Cameron, Cameron May, 1994. £65.00. ISBN 1874698457.

The book looks at the implications of the precautionary principle which states that public and private interests should act to prevent harm to the environment. It covers the history and significance of the principle, implications for science, management and international significance.

NEW RENEWABLE ENERGY SOURCES
A Guide to the Future

World Energy Council, Kogan Page, 1994. £35.00. ISBN 07494 11171.

Results of research undertaken by the World Energy Council into the possible future role of renewable energy in the years to 2020. Possibilities to the year 2100 are also considered. Nine regional groups analysed issues from a local perspective and the results give an insight into the differing energy priorities and needs around the world.

MOTOR VEHICLES IN THE ENVIRONMENT
Principles and Practice

Ed. P. Nieuwenhuis, P. Wells, John Wiley, 1994. £35.00, ISBN 0471949434.

The book highlights the issues which will form the basis of future legislation affecting the motor industry. Chapters included cover economics, infrastructure and raw materials, legislation and incentives and commercial vehicles.

CHEMICAL SAFETY – INTERNATIONAL REFERENCE MANUAL

Ed. Mervyn Richardson, VCH, 1994. DM 248, ISBN 3527286306.

A guide to the tools of chemical safety assessment, from information retrieval through to risk assessment, safety evaluation and legal aspects. It covers air, water and soil pollution as well as occupational exposure to chemicals.

GENERATION IN THE 1990s
Electricity Capacity and New Power Projects – 1994 edition

P. Gray et al, Oxford Economic Research Associates, 1994. £265.00, ISBN 1873482191.

The report is divided into two sections – Analysis and New Power Projects. It sets out two energy scenarios and four capacity scenarios and covers the factors that govern energy supply, pricing and policy developments and the influence of legislation on generation options.

ENVIRONMENTAL HEALTH LAW

F. McManus, Blackstone Press, 1994. £19.95, ISBN 1854313177.

A general overview of environmental health law – covering air pollution, noise, waste, nuisance, food safety, health and safety at work, water, pests, housing, disease and building control.

SUSTAINABLE DEVELOPMENT AND THE ENERGY INDUSTRIES

Ed. N. Steen, Earthscan, 1994. £15.95, ISBN 1853832103.

A compilation of contributions to a workshop held in November 1993 by the Energy and Environment Programme at the Royal Institute of International Affairs. It examines the interaction between environmental legislation and the energy industries.

MOVING FORWARD: OVERCOME THE OBSTACLES TO A SUSTAINABLE TRANSPORT POLICY

Ed. C. Hope, S. Owens, Cambridge Environmental Initiative, £10.00 + £1.50 p&p, ISBN 1874267219.

Proceedings of a seminar addressing sustainable transport in the UK.

VITAL SIGNS 1994-1995

L. Brown et al, Worldwatch Institute, 1994. £10.95. ISBN 185383212.

Information from around the world is presented as 40 key indicators of the environmental, economic and social state of the world. Those used include energy, atmospheric, transportation and environmental trends.

British Standards

Characterisation of Air Quality, Part 1. Units of measurement. BS 6069: Part 1: 1994 ISO 4226: 1993.

Characterisation of Air Quality, Part 2. Glossary. BS 6069: Part 2: 1994, ISO 4225: 1994.

Characterisation of Air Quality, Part 5. General. Section 5.1 Handling of temperature, pressure and humidity data. BS 6069: Section 5.1: 1994 ISO 8756: 1994.

British Standards available from BSI Linford Wood, Milton Keynes MK14 6LE.

FUTURE EVENTS

7-9 NOVEMBER – LANDFILL SITE LICENSING

Two day course on the preparation of site licences; students will be expected to prepare a working plan and draft licence conditions for a proposed site.
Venue: Knuston Hall, Irchester, Northants.
Details: Training Department, IWM Business Services Ltd., Fax: 0604 604467.

9 NOVEMBER –
TOXICOLOGY AND QUANTITATIVE RISK ASSESSMENT

Quantitative risk assessment is increasingly being used to establish whether actual or potential sources of chemical pollution are of concern to public health and thus it is having an important influence on environmental decision making. This meeting will provide an overview of risk assessment and the toxicological aspects of its application. It is aimed at non-experts in industry and government.
Venue: Burlington House, Piccadilly, London.
Details: Michael Quint, The Royal Society of Chemistry Toxicology Subject Group, Tel: 071 231 6043.

9-10 NOVEMBER –
MANAGING WASTES: INTEGRATED POLLUTION CONTROL

Conference dealing with all aspects of environmental management relating to land, water and air, describing the technologies applicable in these areas.
Venue: IMechE Headquarters, London.
Details: Hazel Anderson, Institution of Mechanical Engineers, Fax: 071 222 9881.

16 NOVEMBER –
THE 1994 WASTE MANAGEMENT LICENSING REGIME:
Industry's Interpretation – Good and Bad Experiences

An analysis six months on of the legal framework and update to Circular 11/94 with a hypothetical case study as an example.
Venue: Royal Lancaster Hotel, London W2.
Details: Sarah Mobsby, IBC Legal Studies & Services Ltd., Fax: 071 631 3214.

22 NOVEMBER – THE PRECAUTIONARY PRINCIPLE:
Making it Work in Practice

Whilst the Precautionary Principle has been incorporated into a number of major international agreements, there is still considerable debate about how it can be translated into practice, in particular from managers who seek to translate the concept into their everyday work. The conference organised by The Business - Environment Interface in association with the Environment Council will provide a forum to

understand the practical implications of the Precautionary Principle with experts from a range of disciplines, and an audience from a wide cross section of the people involved with environmental decision making.
Venue: Baden-Powell House, Queen's Gate, London SW7.
Details: Dr. Bob Earll, Tel/Fax: 0531 890415.

27-29 NOVEMBER – INTRODUCTION TO WASTES MANAGEMENT

Introductory course designed to ensure a thorough basic understanding of all aspects of wastes management in both the private and public sectors.
Venue: Knuston Hall, Irchester, Northants.
Details: Training Department, IWM Business Services Ltd., Fax: 0604 604467.

2 DECEMBER – RECYCLING WORKSHOP

Workshop aimed at recycling officers and those with responsibility for recycling in local authorities.
Venue: Stirling Management Centre, Stirling, Scotland.
Details: Training Department, IWM Business Services Ltd., Fax: 0604 604467.

8 DECEMBER – TARGETTING TRAFFIC POLLUTION

Options for Local Air Quality Management

NSCA training seminar covering technology and enforcement, planning and public awareness.
Venue: NEC, Birmingham.
Details: Peter Mitchell, NSCA, Fax: 0273 735802.

6-9 DECEMBER – CLIMATE CHANGE RESEARCH

Evaluation and Policy Implications

Conference primarily to evaluate the results of Dutch climate research during the first stage of the National Research Programme on Global Air Pollution and Climate Change.
Venue: Maastricht, The Netherlands.
Details Mrs. M. Vonk, National Institute of Public Heatlh and Environmental Protection, PO Box 1, 3720 Bilthoven, NL.

Forthcoming Events 1994/95

— Thursday 8 December 1994 —

NSCA Training Seminar

Targeting Traffic Pollution

- Options for Local Air Quality Management

National Exhibition Centre - Birmingham

— Tuesday 13 December 1994 —

NSCA Training Seminar

Part B Processes Update

Cedar Court Hotel - Wakefield

This is a joint venture with the *South East* Institute of Public Health and the same seminar is being held on Monday 12 December in London

— Thursday 16 February 1995 —

NSCA Training Seminar

Greener Fuels for Motor Vehicles

National Exhibition Centre - Birmingham

— Wednesday 29 & Thursday 30 March 1995 —

NSCA Spring Workshop

Air Quality Management - from Concept to Reality

Moat House - Northampton

— Thursday 15 June 1995 —

NSCA Training Seminar

Planning and Pollution Control

National Exhibition Centre - Birmingham

— Monday 23 to Thursday 26 October 1995 —

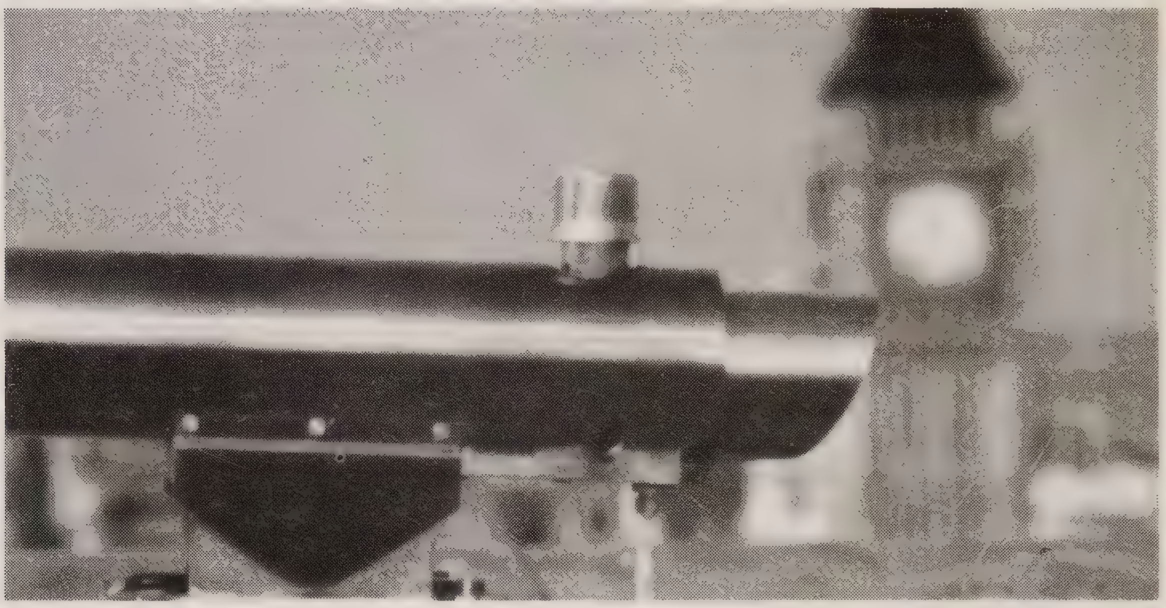
Environmental Protection 1995

62nd Conference and Exhibition

The Spa - Scarborough

For further information on any of the above contact NSCA on 0273 326313

Air quality measurement - for those who most need to know.



For any organisation that needs to manage its air quality, managing starts with measuring.

OPSIS is one of the most widely used air quality monitoring systems in Europe. It is the system of choice, and for all the right reasons. It is versatile, capable of targeting multiple airborne pollutants and hydrocarbons over as many as 12 lightpaths at once. This also enables the monitoring for emissions in several streams in a process, or multiple stacks. It is reliable, operating without contact with the sample, avoiding chemical reaction or corrosive damage . It needs minimal maintenance, reducing intervention and downtime. It is cost-effective and proven in performance. TÜV, UMEG and US EPA have all approved the system.

OPSIS systems are today measuring ambient concentrations of sulphur and nitrogen oxides, benzene, toluene and other gases. In industry, OPSIS is used for continuously measuring emissions of pollutants such as hydrogen chloride, mercury vapour and ammonia, as well as the more common pollutants and combustion gases. Upgrading for extra gases can always be carried out, even when the system is installed and in operation.

Sensors linked to the OPSIS system will accept data from multiple inputs to give a full range of display, reporting and statistical functions. OPSIS software accepts meteorological data, alongside ambient air quality measurements, for meaningful reporting. For emissions monitoring, process control parameters such as flow, temperature and pressure can be incorporated.

Whether measuring the ambient environment or continuous emissions, OPSIS provides the ideal solution.

Turning measurement into management.

Enviro Technology Services plc
Environment House, Dudbridge Road, Stroud, Glos GL5 3EE
Tel 0453 751641 Fax 0453 757596

nsca

CLEAN AIR
AND ENVIRONMENTAL PROTECTION

WINTER 1994

Volume 24 **Number Four**

NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION

**Graseby Andersen
are now manufacturing
environmental monitoring instruments
in the UK for:**

**PM10
particulates
& VOCs**

**Phone us now on 0689 877767
for an information pack on ambient
and stack monitoring applications**

GRASEBY
ANDERSEN

GRASEBY ANDERSEN LIMITED
RIVER HOUSE, LAGOON ROAD, ST. MARY CRAY, ORPINGTON, KENT UK BR5 3QX
TEL: 0689 877767 FAX: 0689 876661

WINTER 1994
VOLUME 24
ISSN 0300-5734

CLEAN AIR

nsca

Publishing Director:
Dr. Tom Crossett
Secretary General, NSCA

Editor:
Loveday Murley

Information/PRO:
Tim Brown

Advertising:
Sally May
Rates on request.

CLEAN AIR is the official journal of the Society but the views expressed in contributed articles are not necessarily endorsed by the Society.

CLEAN AIR is issued free to Members and Representatives of Members.

CLEAN AIR Subscription for 1995 — £24.00

Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements are made.

CLEAN AIR is printed and published in England by the National Society for Clean Air and Environmental Protection,
136 North Street
Brighton BN1 1RG
Tel: Brighton (01273) 326313
Fax: Brighton (01273) 735802

CONTENTS

Editorial 143

NSCA Views
— Environment Agencies 145
— Environment Bill 146
— Environment Committee Inquiry into Volatile Organic Compounds 147
— Review of Noise Legislation 151

NSCA News
— Dirty Diesel Detection Day 154
— Home Energy Conservation Bill 154
— NSCA Annual General Meeting 155
— Council of the Society 1994-95 155
— Divisional News:
  East Midlands and Eastern Division 155
  North West Division 156
  South West Division 157
  West Midlands Division 157
— Scottish Division AGM and Seminar 158
— NSCA Spring Workshop 158

Reports
— Environmental Assessment and Risk Assessment of an Incineration Plant — a Case Study: D.O. Harrop & S.J.T. Pollard 159
— A Dust Meter for Measuring Dust Deposition and Soiling of Glossy Surfaces: Michael J.R. Schwar 164
— A Study of Environmental Low Frequency Noise: J.W. Sargent 170
— Neighbour Noise Problems: What is the Place of Mediation: Paul Holder 177

Update 182

Books and Reports 186

Future Events 190

Advertisers
— Graseby Andersen cvr ii
— Enviro Technology Services Plc cvr iv
— IUAPPA World Congress 189

NATIONAL SOCIETY FOR CLEAN AIR AND ENVIRONMENTAL PROTECTION

(Founded 1899)

Registered Charity, Number 221026

PRESIDENT
Professor The Lord Lewis, KT, FRS
IMMEDIATE PAST PRESIDENT
The Baroness Platt of Writtle, CBE, DL, FEng
VICE-PRESIDENTS
Mr. K. Collins, MEP; The Rt. Hon. The Earl of Cranbrook, DSc, DL;
Wayne David, MEP; John Edmonds; Dr. Caroline Jackson, MEP;
Air Commodore John Langston, CBE; Sir John Mason, CB, DSc, FRS;
The Rt Hon Lord Nathan; Sir Hugh Rossi; Mr. J. Speirs;
Gareth Wardell, MP
CHAIRMAN OF COUNCIL
Mr. K.G. Kaufman
DEPUTY CHAIRMEN OF COUNCIL
Cllr Dr. J.R.P. Evans, Mr. G.W. Barrett
IMMEDIATE PAST CHAIRMAN OF COUNCIL
Professor J.S. Harrison
HONORARY TREASURER
Mr. R. Hill
SECRETARY GENERAL
Dr. R.N. Crossett

HONORARY SECRETARIES OF NSCA DIVISIONS

Scottish Division: Calum MacDonald — Telephone: 0141 227 5552
City of Glasgow DC, Environmental Health Dept.,
23 Montrose Street, Glasgow G1 1RN

Northern Ireland Division: Mervyn Fleming — Telephone: 01232 401805
67 Kilwarlin Road, Hillsborough, Co. Down BT26 6EA

Northern Division: Keith Atkinson — Telephone: 01325 352692
30 Loraine Crescent, Darlington, Co. Durham DL1 5QU

North West Division: R.N. Turner — Telephone: 0151 443 4731
45 Down Green Road, Harwood, Bolton BL2 3QD

Yorkshire & Humberside Division: Stephen Carden — Telephone: 01924 295391
City of Wakefield MDC, 29 King Street, Wakefield WF1 2SY

West Midlands Division: J. Sweetland — Telephone: 01952 202558
Senior EHO, Pollution Control, Wrekin Council, Civic Offices, PO Box 212, Telford TF3 4LB

East Midlands and Eastern Divisions: Dr. Bill Pearce — Telephone: 01623 656656, ext. 3139
Environmental Health Services, Mansfield DC, Civic Centre, Chesterfield Road South, Mansfield, Notts NG19 7BH

South East Division: J.J. Beagle — Telephone: 0181 452 0203
19 Oxgate Gardens, Brent, London NW2 6EA

South West Division: J.A. Jefferies — Telephone: 01272 223343
Environmental Health Services, Bristol City Council, Brunel House, St. Georges Road, Bristol BS1 5UY

South and Mid Wales Division: T. Jones — Telephone: 01495 766775
28 Maes-y-celyn, Griffithstown, Pontypool, Gwent

EDITORIAL

LOCAL AIR QUALITY MANAGEMENT

From Concept to Statute Book?

Thinking on local air quality management (LAQM) is developing apace. The concepts explored at the NSCA 1993 LAQM seminar were expanded in the DOE discussion paper *Improving Air Quality*, and refined at our 1994 Spring Workshop. A national framework is taking shape and LAQM could soon be a reality if the Government backs its promises with action and resources.

John Gummer's new proposals for a framework for improving air quality — based on a process of local air quality review, assessment and management planning by local authorities — largely mirror our own view. The January announcement was especially welcome since he spoke on behalf of Environment and Transport Departments.

Mr Gummer and his fellow environment and transport ministers clearly take the matter seriously. But it seems that they have struggled to persuade other Cabinet colleagues of the need for a concerted strategy to clean up the nation's air. We need to strengthen their hand by demonstrating that LAQM is the most cost effective way of achieving vital environmental, economic and social goals.

A rational approach to LAQM also should provide the basic building blocks for management of transboundary air quality issues such as acid deposition, VOCs and atmospheric change. The possibility of future developments along these lines should be incorporated into the framework from the outset.

NSCA has argued that LAQM must have force of law with a statutory duty for local authorities to produce air quality management plans. The Government now says it will do this at an "early legislative opportunity", and we shall soon learn how serious this commitment is. NSCA President Lord Lewis and Vice-President Lord Nathan have tabled an amendment to the Environment Bill currently before Parliament, setting out the basis for a national strategy for improving air quality. This reflects the DOE's own proposals. To date, Mr Gummer has promised to "look at" the amendment.

Whilst the Society seeks to influence the legislative framework, we are equally concerned to undertake practical groundwork to ensure that LAQM is implemented rationally and consistently. Hence our 1995 Spring Workshop *Local Air Quality Management — from Concept to Reality* addresses practicalities: the form and content of air quality reviews and plans appropriate to local circumstances, the techniques of air quality characterisation and management and the necessity for rigorous programme design and quality assurance. We hope that this will be a springboard for those who are likely to be involved in LAQM at a local level.

Like NSCA, the professional bodies and consultancies are gearing up for what promises to be a challenging and rewarding new phase in environmental protection. Local authorities are keen to play a central role in air quality management — if they are given the necessary guidance, resources and legislative backing.

The key players are all ready and waiting. As we go to press, the official response to the amendment tabled by Lord Lewis and Lord Nathan is unknown. But if the Government is at all serious about improving air quality, it must surely seize this opportunity to turn its proposals from concepts into reality.

ENVIRONMENTAL PROTECTION 95
SCARBOROUGH
23-26 OCTOBER 1995
CALL FOR PAPERS

Every year the NSCA Conference addresses a wide range of issues concerned with assessing and minimising the environmental impact of industry, transport, agriculture and the domestic sector with emphasis on energy conservation and waste minimisation or safe disposal.

If you have relevant knowledge or practical experience in dealing with topical problems, you should consider giving a 15 minute paper at the conference.

We invite potential authors to submit one-page proposals summarising the scope of the paper along with its title, the name of the author, his/her affiliation and a contact address and telephone number.

Proposals should reach NSCA at the address below by 2 April. Authors will be notified in May. The conference registration fee will be reduced for any author invited to give a 15 minute paper.

The Secretary General
NSCA
136 North Street, Brighton BN1 1RG Fax: 01273 735802

NSCA VIEWS

ENVIRONMENT AGENCIES

The *Environment Bill*, Part I of which establishes Environment Agencies for England, Wales and Scotland, was introduced into the House of Lords in early December. The Bill is summarised later in this issue of *Clean Air* in the "Update" section. An earlier Government consultation paper set out options for the geographical and managerial structure of the Agency for England and Wales.

NSCA Comments

NSCA wishes to see two Agencies which secure rational environmental protection through progressively wider influence on policy, the economy and society.

By contrast, the Bill gives the Agencies a narrow and fragmentary remit. We have made the case for a two-tier Commission/Executive structure with a clear distinction between regulatory and operational activities. In the short term we wish to secure a broader vision than the structure now proposed by ensuring that reorganisation is sufficiently radical to create a foundation which could lead to this longer-term aim. We believe that the Agencies' duties should be:

- Comprehensive monitoring of environmental quality
- Integrated assessment of results
- Regulation and advice to Ministers on its development
- Management measures to achieve environmental quality objectives

NSCA considers there to be four broad areas of concern:

1. The proposed changes represent reorganisation without development. In their respective spheres of responsibility, NRA, HMIP and the WRAs are dealing with enormous challenges. Staff now face a period of turmoil without the prospect of benefit either to the environment or to the economy. These burdens might have been acceptable if the legislation had contained any hint of commitment to development of wider responsibilities. We recognise that broadening of the regulatory remit cannot occur overnight, and the Society therefore remains committed to the idea of a two-tier Agency. One tier — an Environment Commission, would deal with strategic issues whilst the second — an Environment Executive, would deal with day-to-day matters.

2. There is an asymmetry between the obligations placed on the Agency to protect the environment and those to minimise the burden on industry and others. The proposals should require the Agency to seek and implement challenging targets for environmental quality in the most cost effective fashion. Even the term 'unnecessary burdens' is inappropriate. The aim should be to avoid rendering industry uncompetitive. Experience around the world has shown that challenging domestic

standards for environmental protection can lead to technology forcing, which gives competitive advantage in world markets. The Agency should be allowed the freedom to exercise judgement on such matters.

3. The proposals centralise environmental control at a time when evidence is accumulating worldwide that subsidiarity — allowing local choice from a national menu — is the best way of coupling economic development and environmental protection. It is quite wrong that Ministers should be able to direct the Agency whilst it only has an obligation to consider the views of local committees on *general* aspects of its work. The local committees should have a role in the development of specific proposals which allow environmental protection regimes to be attuned to local circumstances. Such an approach would benefit not only communities, but also most small businesses which contribute to their prosperity yet do not have the knowledge and resources to lobby Whitehall direct. The central directing role of Ministers greatly diminishes the chances of the Agency emerging as the guardian of the environment in the way in which NRA has done.

4. With respect to proposals for the Scottish Agency SEPA, the Scottish Office has failed to provide any convincing argument for the removal of responsbility for air pollution control from Scottish local authorities. Local authorities throughout Britain have shown themselves equally capable of regulating Part B industrial processes; we challenge the need for upheaval and centralisation north of the border when a perfectly good locally-accountable system is already in place.

ENVIRONMENT BILL

Commenting on the general content of the Environment Bill, NSCA regrets that it does not make provision to secure a more coherent approach to air quality management at local, regional and national levels. NSCA suggests that the Bill presents an excellent opportunity which might not re-occur for several years to implement and develop the recommendations of the 18th Report of the Royal Commission on Environmental Pollution on Transport and the Environment. This calls for systematic management to achieve standards of air quality that will prevent damage to human health and the environment. NSCA wants to see the Government providing support for the development of co-operation between agencies and authorities through provision of guidance on air quality management arrangements appropriate to particular circumstances, and support for data quality assurance and dissemination.

ENVIRONMENT COMMITTEE INQUIRY INTO VOLATILE ORGANIC COMPOUNDS

In July 1994 the Environment Committee invited evidence on volatile organic compounds, with particular reference to

- environmental and human health effects of current and projected levels of emissions;
- adequacy and implementation of statutory controls over their discharge into the atmosphere, indoors, into water, and into soil;
- technological, regulatory and economic options for the achievement of further reductions;
- the consquences for industry of possible controls on industrial processes; and
- the methodology, quality and frequency of measurements.

NSCA Comments

1. Rationale for VOC abatement

There are three reasons for reducing VOC emissions: the direct health effects of certain VOCs, the indirect contribution which VOCs make to levels of photochemical oxidants which in turn impact upon human health, materials and biological systems, and because emissions frequently indicate loss of valuable resources. The Society welcomes the Government's intention to "continue to explore opportunities to secure, by cost-effective means, reductions in national annual VOC emissions greater than the minimum of 30% by 1999 from 1988 levels required by the VOC protocol"(1), and notes that abatement efforts will be targeted on VOCs with high photochemical oxidant creation potential (POCP).

Government policy towards air pollution control will increasingly be effects-based. The Society supports this approach and would like to see it applied to VOCs, with a strategy which sets sectoral targets based on environmental and human health criteria.

The Expert Panel on Air Quality Standards (EPAQS) reports(2) have recommended an Air Quality Standard of 50 ppb (8hr) for ozone and 5 ppb (running annual average) for benzene with a long-term aim of 1 ppb.

The third PORG report(3) indicates concern about future levels of photochemical oxidants, from both environmental and health perspectives. "Despite projected reductions in European Emissions of VOCs and NOx, associated reductions in ozone will be insufficient to meet air quality targets for the year 2000 & beyond". ". . .models indicate that a 30% reduction in VOC emissions would lead to a 10-15% reduction in episodic peak ozone levels. . .it will not be enough to solve the ozone problem in one step". The impact of the VOC Protocol will reduce incidence of poor AQ but "during persistent summertime anticyclonic conditions, epsiodes of "POOR" AQ will still occur widely throughout the UK. Little progress will have been made in any case towards meeting the critical levels set to protect sensitive plant species".

A report to DOE(4) on material damage from ozone suggests that the annual bill could be of the order of hundreds of millions of pounds. Measures to reduce NOx from road traffic may actually result in an increase in ozone in urban areas and resulting material damage.

Unpublished work by the Building Research Establishment suggests that indoor levels of VOCs are a matter for concern — health guidelines for benzene and TVOCs appear to be exceeded in a significant number of dwellings studied.

Any strategy for VOC reduction should set targets based on assessment of all possible impacts; for instance targets for compounds such as benzene and 1,3 butadiene which have a low POCP but are suspected of direct health impacts should be set on the basis of comprehensive analysis. In devising an effects-based strategy for reducing VOCs, a matrix which scores for a range of effects, including photochemical oxidant formation and toxicity would produce a more optimal ordering of abatement priorities.

2. Elements of an abatement strategy

The updated UK Strategy database(5) shows total UK NMVOC emissions of 2002 kt/a from stationary sources, and 972 kt/a from mobile sources. The most significant sources are road traffic, solvent use (especially paint), the oil industry and arable farming.

We believe that the overall approach to an abatement strategy should be based on sectoral targets determined by the cost-effectiveness per tonne of VOC abated and weighted for environmental and health risk factors attached to specific VOCs. Elements of the strategy should be consistent with other objectives for Sustainable Development. We recognise that considerable debate will be necessary to achieve consensus on all aspects of this approach and especially on risk factor weighting, so that implementation will be progressive.

Mobile sources

Even allowing for the application of new vehicle emission standards and uncertainties in forecasting, exhaust emissions from road vehicles will still be by far the largest single source of VOCs in 1999. As a matter of urgency road traffic emissions forecasting should be improved by refinement in relation to assumptions about the spatial distribution of traffic growth, rate of catalyst failure, changes in driving patterns, and market penetration of diesel cars. Implementation of measures to reduce vehicle emissions will be costly and disruptive; programmes should be based on sound data.

We perceive a need for action on two fronts. Firstly a concerted programme to reduce overall vehicle miles travelled (VMT). A range of planning, fiscal, infrastructural and educational measures are available to address this need but the Government has yet to set targets or design a coherent programme. Second, action on vehicle emissions to ensure that standards drive the development of technology, and an enforcement effort designed to ensure that vehicles continue to meet their design specifications.

In the short term priority must go to encouraging the correct tuning of pre-catalyst cars. This means an MOT emissions test based on meeting manufacturers' conformity of production standards (rather than the existing simple pass/fail test), and with improved quality control. Low-technology initiatives to identify gross polluters — such as the NSCA's own dirty diesel-spotting initiatives(6) — also offer an immediate opportunity to target flagrant offenders.

In the medium term catalyst cars will come to dominate the fleet and an effective system of performance assurance must be developed. We await with interest further evaluation of remote-sensing devices which are able to detect catalyst failure and offer the prospect of remediation. We also believe the environmental and economic benefits of fuel reformulation and alternative automotive fuels should be evaluated with some urgency.

In the longer term enforcement effort should be designed to fulfill the potential of Onboard diagnostic systems to monitor and optimise the performance of pollution control equipment. Vehicle and fuel specifications, standards for in-service testing and repair, and enforcement systems must be co-ordinated so that responsibility for "cleaner and leaner" vehicle miles travelled is apportioned between vehicle manufacturers, owners, operators, repairers, fuel suppliers and enforcement agencies, on a least cost basis within an integrated system of air quality management. Catalytic converters have been required to meet US emission standards for petrol cars for two decades.

Stationary Sources

Limitations on **solvent use** represent a major challenge. Solvents are a large component of the national emission inventory, and many are emitted indoors through paints and household products. Whilst consumer information schemes such as ecolabelling may assist in informing product choice we believe that reliance on a voluntary approach is unlikely to deliver effective market penetration of low-solvent and alternative products. The impact on the surface coatings industry of regulation under the *Environmental Protection Act* shows that major changes in use patterns are possible. Given the diffuse pattern of solvent use, fiscal instruments could be used to favour low-solvent products in unregulated sectors. These should be backed by practical demonstrations and targets should be set which will trigger regulation if they are not met.

Oil industry emissions in the petrol production and distribution chain up should reduce significantly once EU "Stage I" abatement measures are agreed, but the balance of further measures remains to be decided. New petrol cars are fitted with small carbon canisters which control most evaporative losses from the vehicle fuel system under normal operation. This leaves refuelling — where a large burst of vapour has to be controlled in a short time — as the final loophole. The options are to recover vapour through onboard vapour recovery (**OBVR**); or through the petrol pump delivery nozzle (**Stage II** recovery).

Policymakers at national and EU level appear currently to be favouring Stage II. NSCA believes that OBVR should be mandated as the measure most likely to bring about the greatest longterm savings, whilst Stage II should be available as a discretional air quality management measure in localities where the AQ standard for benzene is exceeded, or in regions where the AQ standard for ozone is exceeded.

3. Summary

- There is a need for further reductions in VOCs to reduce the incidence of ozone episodes.
- The overall approach to VOC abatement strategy should be based on sectoral targets determined by the cost-effectiveness per tonne of VOC abated and weighted for environmental and health risk factors attached to specific VOCs.
- Risk assessment is likely to suggest that more emphasis should be placed on indoor VOC abatement.
- The Government should set targets and design a coherent programme to reduce vehicle miles travelled.
- Action on vehicle emissions should ensure that standards drive the development of technology; enforcement effort should ensure that vehicles continue to meet their design specifications.
- Vehicle standards, testing and maintenance regimes, and fuel specification should be harmonised as part of an integrated system of air quality management.
- Reliance on a voluntary approach is unlikely to deliver effective market penetration of low-solvent and alternative products; fiscal measures should be considered.
- Onboard vapour recovery should be mandated for the petrol vehicle fleet; "Stage II" controls should be available as a discretionary air quality management measure.

4. References

1. Reducing Emissions of Volatile Organic Compounds and Levels of Ground Level Ozone: A UK Strategy. DOE October 1993. HMSO.
2. EPAQS Recommendations for Ozone and Benzene Air Quality Standards 1994. HMSO.
3. Ozone in the United Kingdom 1993. Third Report of the UK Photochemical Oxidants Review Group 1993. DOE.
4. An Assessment of the Potential Damage to Materials in the UK from Tropospheric Ozone. 1994. AEA Technology.
5. Emissions of Volatile Organic Compounds from Stationary Sources in the UK. N.R. Passant 1993. Warren Spring Laboratory.
6. Clean Air & Environmental Protection, this edition.

REVIEW OF NOISE LEGISLATION

Introduction

In response to the ever increasing number of neighbour noise complaints, the Environment Minister, Robert Atkins, has set up a small Working Party to identify quicker and simpler remedies for resolving problems. In particular the Working Party will consider whether alternative approaches to those in current legislation could make better use of scarce local authority and police resources.

NSCA welcomed the establishment of the Working Party, pointing out that neighbour noise is one of the major issues in the NSCA workload; we continue to detect a high level of concern from both public and regulators. However we are concerned that discussions about the creation of new powers or duties may be used to camouflage an underlying lack of resources for enforcement.

We believe there are two essential questions which the Working Party should address: whether existing powers are adequate, and if not, what additional measures would improve matters. To provide some objective information on these questions, NSCA undertook a survey of local authorities in August 1994.

In summary the NSCA survey found that local authorities have seen an increase in workload due to noise complaints, and that most have changed their noise policies and procedures within the last two years. About a third think that the law controlling noise as it stands is inadequate; slightly more say the law would be adequate, if they were given more resources for enforcement.

In particular authorities would like to see additional legal powers to tackle one-off noisy events, and some foresee an increasing role for the police. We found that the noisy party problem is widespread and a number of authorities have successfully confiscated sound equipment, generally with police co-operation. The majority of authorities still do not provide an out of hours service but many are considering the possibility.

We believe it is helpful to distinguish between **persistent nuisance problems** which do not require an immediate response to complaints, but may need to be investigated out of hours; and **one-off noisy events** which may need an immediate response, perhaps with police involvement.

NSCA believes that the legislation is largely adequate for the first category and that the main problem is lack of resources. For the second category, the current framework is adequate in theory but is proving inadequate in practice.

Improving the Current Framework

NSCA has proposed a number of ways in which the current framework could be operated more effectively.

1. We recommend a **memorandum of understanding btween DOE and the Home Office on EHO/police co-operation**. It is clear from the NSCA survey that the degree of co-operation with police varies widely across the country. Police representatives tell

us that noise control is very low on their list of priorities, but there are examples of local authority officers working in tandem with police to provide rapid and effective response to noise problems. A change in Home Office priorities for police enforcement activities could improve the noise climate very quickly indeed, without the need for any changes in legislation.

2. We recommend a **streamlining of warrant procedures and improved information for magistrates**. Again, examples of local authority good practice include the "instant" issue of warrants by duty magistrates, and seminars for magistrates on noise and nuisance issues.

3. Greater use could be made of **equipment confiscation**, certainly in one-off incidents and possibly as an alternative or in addition to fines where notices are contravened.

4. The updated **NSCA Local Authority Guidelines**[2] aim to provide an acceptable baseline response to noise complaints and encourage the formation of formal noise policies by local authorities. They also give guidance on the use of customer satisfaction surveys to assess the effectiveness of procedures.

5. An unknown number of neighbour noise problems — possibly around a half — can be attributed at least in part to **inadequate sound insulation levels**. It is scandalous that inadequate enforcement of Building Regulations is resulting in a national housing stock which fails to protect residents from normal levels of neighbour noise. The development of on-site testing, properly enforced by Building Inspectors during construction, is an essential component of any strategy to reduce neighbour noise problems. Simple guidance to enable local authority officers to assess whether sound insulation is a contributing factor to any complaint would also be helpful; NSCA hopes to develop a protocol on this matter.

Creation of a New Noise Offence

We sympathise with noise sufferers who would like to see tougher legislation; the system is clearly failing to protect some of the population. In considering the possibilities for a new offence we must ask: what would work, and who would enforce?

One approach would be to improve the powers available to local authorities. We are not convinced that recent Departmental suggestions of a "lower" level test of noise annoyance would be sufficiently distinct from the concept of nuisance to be useful on either count. If a good case can be made for noise nuisance then action should be taken as speedily as possible. If it cannot, we doubt whether simply being annoyed by noise should carry the option of legal action. From a civil liberties viewpoint, the right to make reasonable amounts of noise has to be balanced against an individual's right to peace and quiet in their own home. A legal test based on being annoyed would run the danger of blurring these two rights.

A second approach would be to give the police enhanced powers to deal with noise nuisance by making it an arrestable offence. This would align with practice in some other countries, which tend to rely on objective tests. However there are some worrying aspects associated with such an approach. It would duplicate enforcement responsibility and put the police in a position of making a judgement about the acceptability of noise either on a subjective basis (as local authority officers do) or using an objective test. Measuring noise levels does not lend itself easily to breathalyser-style technology; an objective test would be difficult to devise. A subjective test could be appropriate in obvious cases of extreme noise where distress was being caused, but could still be subject to legal challenge, as is the case with existing nuisance legislation. Finally, experience with police enforcement in Scotland has shown that their effectiveness in dealing with noise complaints depends upon a willingness to take action. There would be no point in giving police additional powers unless they were available to respond to complaints.

Making noise a police matter could also work against a longer-term objective of improving social attitudes. Criminalising noise could tend to increase its attractiveness as an act of rebellion. Local authorities may be better placed to promote noise education and neighbourhood responsibility.

Summary

If the Government wishes to address the noise control problem it could achieve rapid results by setting clearer objectives for local authorities and police and, crucially, improving the resources available for enforcement of the existing legislation.

The case of additional legal powers raises some difficulties. The perceived need is for a rapid and effective remedy for noisy events, which is responsive to public complaints but which protects civil liberties. Whilst this might be desirable in principle, a practical formula has yet to emerge.

Discussions about new legislation should not divert attention from the fact that noise enforcement is a resource-intensive activity, whether for local authorities or the police. Any legislation requires political commitment at both local and national level to provide the necessary resources for noise control.

References

1. Implementation of Noise Nuisance Legislation, NSCA Survey, October 1994. Available free from NSCA.
2. Neighbour Noise Problems, NSCA Local Authority Guidelines, October 1994. Available from NSCA, free to Members. Non-Members £5.00.

NSCA NEWS

DIRTY DIESEL DETECTION DAY

Over 350 local authorities throughout the UK have expressed interest in participating in NSCA's campaign to combat the nuisance caused by unacceptably smoky buses and HGVs on our roads.

Local authorities have been invited to organise "dirty diesel" detection days in town centres, using local pollution control officers to spot and report smoking vehicles to the Department of Transport. Plans for the initiative were drawn up with assistance from the Department of Transport and the Department of Environment and an action pack with guidelines and report forms was produced.

The latest medical research suggests that the health impact of particulate air pollution from smoky vehicles is much more serious than had previously been thought. Vehicle pollution is also the single biggest threat to air quality, and there is widespread agreement that more must be done to target polluting vehicles. Despite constraints on resources and enforcement powers, many local authorities are exploring practical measures they can take to reduce vehicle pollution.

A major aim of this phase of the campaign, which is to run until May 1995, is to try out a simple form of enforcement and to evaluate its effectiveness as a means of improving local air quality. Evidence about the proportion of unacceptably smoky vehicles on the road should also add weight to calls for Government action to provide incentives for bus and HGV operators to clean up their vehicles.

HOME ENERGY CONSERVATION BILL

NSCA has written to MPs asking them to support the Second Reading (20 January) of the *Home Energy Conservation Bill* which has been adopted by Diana Maddocks MP (LD, Christchurch) who came first in the Private Members' ballot. This is a second attempt at getting this Bill, which is being promoted by the Association for the Conservation of Energy together with a number of other organisations, onto the Statute Book. In the last Parliamentary Session, Government action in proposing 216 amendments at Report Stage ensured the Bill ran out of time.

The Bill, which is very similar to that put forward last year requires local authorities to make plans for achieving 30% energy saving; all interested parties would need to be consulted and a timetable for implementation set by the Secretary of State.

NSCA ANNUAL GENERAL MEETING

The 1994 AGM was held in Blackpool on 24 October. Lord Lewis of Newnham was re-elected President and Cllr Len Poole was elected a Vice-President.

Len Poole holds a unique place in the Society as being the only person to have been elected to both main offices of the Society — President, 1987-89 and Chairman of Council 1984-85. He was elected to Honorary membership of the Society in 1992. He has been Chairman of the NSCA's Northern Division and a member of Council since local government reorganisation, as well as being a member or co-opted member of all NSCA's standing committees.

Brian Douglas and Len Medlycott were elected to Honorary Membership of the Society. Brian Douglas has been associated with the Society for many years. particularly with the North West Division having been at one time or another its Chairman, Vice-Chairman and Hon. Secretary/Treasurer. Prior to retirement Brian worked for St. Helen's MBC. Len Medlycott was Hon. Secretary of the West Midlands Division from 1984 until early 1994; until his retirement from local government service in 1988 he represented Wrekin District Council.

COUNCIL OF THE SOCIETY 1994-95

Cllr Dr. John R.P. Evans took over as Chairman of the Society in October 1994, in succession to Geof Kaufman (North West Division). Cllr Dr. Evans is also Vice-Chairman of the South and Mid-Wales Division and is currently an independent management consultant specialising in quality assurance and marketing. He was elected a member of Rhymney Valley DC in 1976 and was appointed to the European Commission Committee of the Regions in 1993.

George Barrett (PowerGen & South East Division) becomes First Deputy Chairman of Council and Paul Cooney (LB of Greenwich and Chairman of South East Division) becomes Deputy Chairman.

DIVISIONAL NEWS

East Midlands and Eastern Divisions

The East Midlands and Eastern Divisions have had an active and busy year. The Divisional Council met on three occasions at Kelham Hall, Newark and there were three open Divisional meetings — at Peterborough in March, De Montfort University, Leicester in September and at King's Lynn in November. The November meeting was hosted jointly by King's Lynn and West Norfolk BC and the Dow Chemical Company. The AGM in June was held at Mansfield District Council and Toray Textiles (UK). This meeting saw the standing down of David Romaine who had provided the Division with unstinting secretarial service for the past eight years. He has been succeeded as Hon. Secretary by Bill Pearce.

The meetings at De Montfort University and King's Lynn were particularly relevant to the current National thinking within the NSCA in that they covered the themes of sustainable energy, energy conservation and waste minimisation — topics close to all our members' hearts.

The King's Lynn meeting was addressed by the Secretary General, Dr. Tom Crossett, who explained the current national policy and his own personal policy of attending the Divisions at least once a year to openly invite comments from members concerning the policy direction of the Society.

The Division is actively trying to co-ordinate its local authority members to carry out a "dirty diesel" spotting day and it would appear that most authorities in Nottinghamshire, Derbyshire and Lincolnshire are to carry this out on *1 February, 1995*, weather permitting!

Divisional Council meetings, all at Kelham Hall, have already been arranged for 1995 on 23 February, 25 May and 2 November.

Open Divisional meetings for 1995 are scheduled for March at the Toyota car manufacturing plant at Derby; the AGM in June is at European Gas Turbines, Lincoln. Sizewell "B" nuclear power station are hosts for the September meeting, whilst the November meeting is to be jointly hosted by Butterley Brick Company and Newark and Sherwood DC.

For further information on any of these meetings, contact the secretary, Dr. Bill Pearce, who also would welcome any suggestions concerning venues for future meetings in 1996, on 0623 656656 ext. 3139.

North West Division

The NW Division's AGM was hosted by Oldham MBC on 13 September 1994. Proceedings were opened by the Mayor, and the AGM was attended by some 49 members of the Division. Proposals for election to Divisional Council well exceeded the number (21) allowable, indicating the increasing interest in the work of the Society, however none were turned away as the 'extra' members will be regarded as being co-opted for this year.

Members were reminded by the Chairman, Mr. R. Hebden, of the valuable contribution that officers, elected to represent the division on the various national committees, made and noted that all those who sat on committees at present conformed to the request of HQ of regular attendances at such meetings. On looking back over the year he reflected on the work undertaken by members and thanked all those who had been involved in the preparation of the programme for the Society's Annual Conference in October.

At the conclusion of the business meeting Dr. R. Niven spoke on the relationship between asthma and pollution, calling on research he had undertaken in Halton and Runcorn and indicating that there seemed to be a synergistic effect of pollution particulates and house dust mite faeces. Evidently, the cleaner the house, the more tight sealed the ventilation and the closer the carpets to the skirting boards coupled with higher humidity, all contributed to the dust mite population soaring. Increased eating and defecating causes allergic reaction and asthmatic symptoms which is again aggravated by changes in pollution levels. The topic proved a useful catalyst for discussion which continued through the buffet lunch.

Prior to lunch 'service award certificates' were given to D. Horner (British Gas), G. Kaufman (Tameside) and B. Douglas (Private Member) for undertaking roles as Honorary Secretary or Chairman. Brian Douglas was promoted to HQ for consideration of Life Membership for the excellent work he has undertaken and the longevity of his association with the Society.

At the Divisional Council meeting held on 10 November 1994 hosted at Halton Borough Council, members, at the request of the Vice Chairman Councillor Mrs Kath Shaw, undertook to forge a link with Third World Countries and support a delegation to advise on environmental problems. The meeting closed with a talk by Chris Yates on the OPSIS monitoring system used at Halton for pollution assessments. Members found this particularly useful in their continuing assessment of appropriate monitoring systems which can be adopted to meet the recommended parameters following the publication of the results from the Air Quality Management Consultation document.

Merseyside has been awarded £340,000 for a Waste Minimisation Demonstrator Project which is to be run on the same lines of the Aire and Calder and Catalyst Projects using March Consultants to assist in delivery of savings to identified companies. The Division together with Knowsley MBC and March Consulting Group is co-ordinating a Seminar on Waste Minimisation to be held on 8 February at Huyton, Knowsley. The Seminar is being sponsored by the Government Office for the North West and the NRA. The seminar will be concentrating on the real economic benefits of waste minimisation: how reduced consumption of materials and utilities and less waste in production translate into lower costs and greater efficiency; how reducing waste can increase profits. These benefits come in parallel with reduced environmental impact and improvements in quality, health, safety and productivity generally. The seminar will explain how to start a programme and how to maintain continuous improvement, with experiences of waste minimisation from companies who have already started on the journey, and the value of the savings which they have achieved.

South West Division

The activities of the South West Division continued apace throughout 1994, with regular quarterly meetings being well supported. Invited speakers together with site visits were organised for each meeting with topics ranging from bio digestion, to the mechanics of operating a new bulk handling for the Bristol Port Company within the constraints of a Part B authorisation.

At the annual general meeting held in September the new Honorary Secretary Mr Peter Gendle took over from Mr John Jefferies. He can be contacted during the day at Woodspring District Council, Weston-super-Mare, Tel: (01934) 634839.

West Midlands

At the AGM at Blackpool on 24 October 1994 Len Medlycott was elected honorary member of the Society in recognition of his services as Divisional Secretary for 9 years.

Unfortunately Len was unable to collect the certificate in person and it is hoped to arrange a presentation at a future Divisional meeting.

The Division's membersip is increasing slowly and it is hoped to have a concerted memberhip drive in the new year. The division is exchanging information with the Midlands Environmental Business Club but has yet to organise any joint initiatives. The Secretary has been elected to represent the Division on Local Agenda 21 discussions with Birmingham City Council.

NSCA SCOTTISH DIVISION

ANNUAL GENERAL MEETING AND SEMINAR

Tuesday, 23 Febuary 1995
Moat House International Hotel · Glasgow

The Environment Bill which is currently before Parliament will establish a Scottish Environment Protection Agency (SEPA). Speakers representing the various functions which are expected to form SEPA's remit will give their views on the draft legislation.

The fee for the seminar is £25.00 (+VAT) for NSCA members and £37.50 (+VAT) for non-members.

For more details contact:

NSCA (Scottish Division),
℅ City of Glasgow DC
23 Montrose Street, Glasgow G1 1RN

Tel: 0141 227 5552
Fax: 0141 227 5561

NSCA SPRING WORKSHOP

29-30 MARCH 1995
Moat House · Northampton

LOCAL AIR QUALITY MANAGEMENT
from concept to reality

This two day workshop focuses on practical aspects of air quality management and will include sessions with AQ computer modelling packages. Presentations will include

Update on Government policy & initiatives · Air quality reviews — what they are & how to do one · Monitoring — designing a programme · Introduction to emissions inventories · Estimating road traffic emissions · Modifying local met data · Air pollution control strategies · Planning for air quality · Informing the public.

For further details telephone NSCA on 01273 326313.

REPORTS

ENVIRONMENTAL ASSESSMENT AND RISK ASSESSMENT OF AN INCINERATION PLANT — A CASE STUDY

D.O. Harrop and S.J.T. Pollard
Aspinwall & Company

Introduction

Environmental Impact Assessment (EIA) refers to the evaluation of the impacts likely to arise from a development which may affect the environment. EIA has been applied to a plethora of development projects of varying scales and in particular, incineration. This paper seeks to explain the procedural steps of EIA for a proposed sewage sludge incinerator in Belfast, Northern Ireland, UK (Department of the Environment for Northern Ireland, 1994).

Screening

The initial step in an EIA process is to determine whether the environmental impacts of a proposed project indeed warrants a comprehensive EIA. This initial step is commonly known as screening. Under Schedule 1 of the UK *Town and Country Planning (Assessment of Environmental Effects)* Regulations 1988, a waste disposal installation for the incineration of chemical treatment of special waste requires an EIA. In the situation of the case study the developer elected to carry out an EIA even though it was not a mandatory requirement. The *Planning (Assessment of Environmental Effects) Regulations (N.I.) 1989* were applied to the case study. The UK EIA procedural system is detailed elsewhere (Department of the Environment UK, 1989).

Impact Identification

The first stage of the EIA involves the identification of most likely and most significant environmental impacts. This stage is commonly called the scoping study. The objectives of the exercise are to:

- canvass as wide a body of opinion as practicable, to ensure a comprehensive coverage of local issues and/or concerns;
- identify the *key* issues normally associated with the proposed development;
- focus the study on *key* issues relevant to the locality; and
- collect information or 'baseline' data held by certain bodies which is relevant and helpful in undertaking the EIA.

The scoping exercise provides a description of the most important environmental, social and economic issues together with the concerns of the community and interested organisations alike in order to describe the potential impacts within the context of the environmental setting of an incinerator development. There are a range of EIA methods (e.g: checklists, matrices, networks, overlays, etc) to aid the individual in the identification of potential impacts. Two methods widely used in EIA to access incineration development impacts are checklists and matrices. An application of the use of a simple matrix for an incinerator development in Belfast is shown on Figure 1.

Development actions are broadly divided up into construction, commissioning and operation, and decommissioning. To aid the interpretation of the matrix which does not provide any weighting of the predicted impacts, a summary key has been used. Development/environment interactions are divided into four categories: the potential interaction can have no impact (no effect); can result in a potentially detrimental effect on the environment if not mitigated (potential adverse effect); can result in a beneficial environmental effect (potential positive effect); or subject to the detail of the design, could be beneficial or alternatively, could yield adverse effects (potential positive and negative effects).

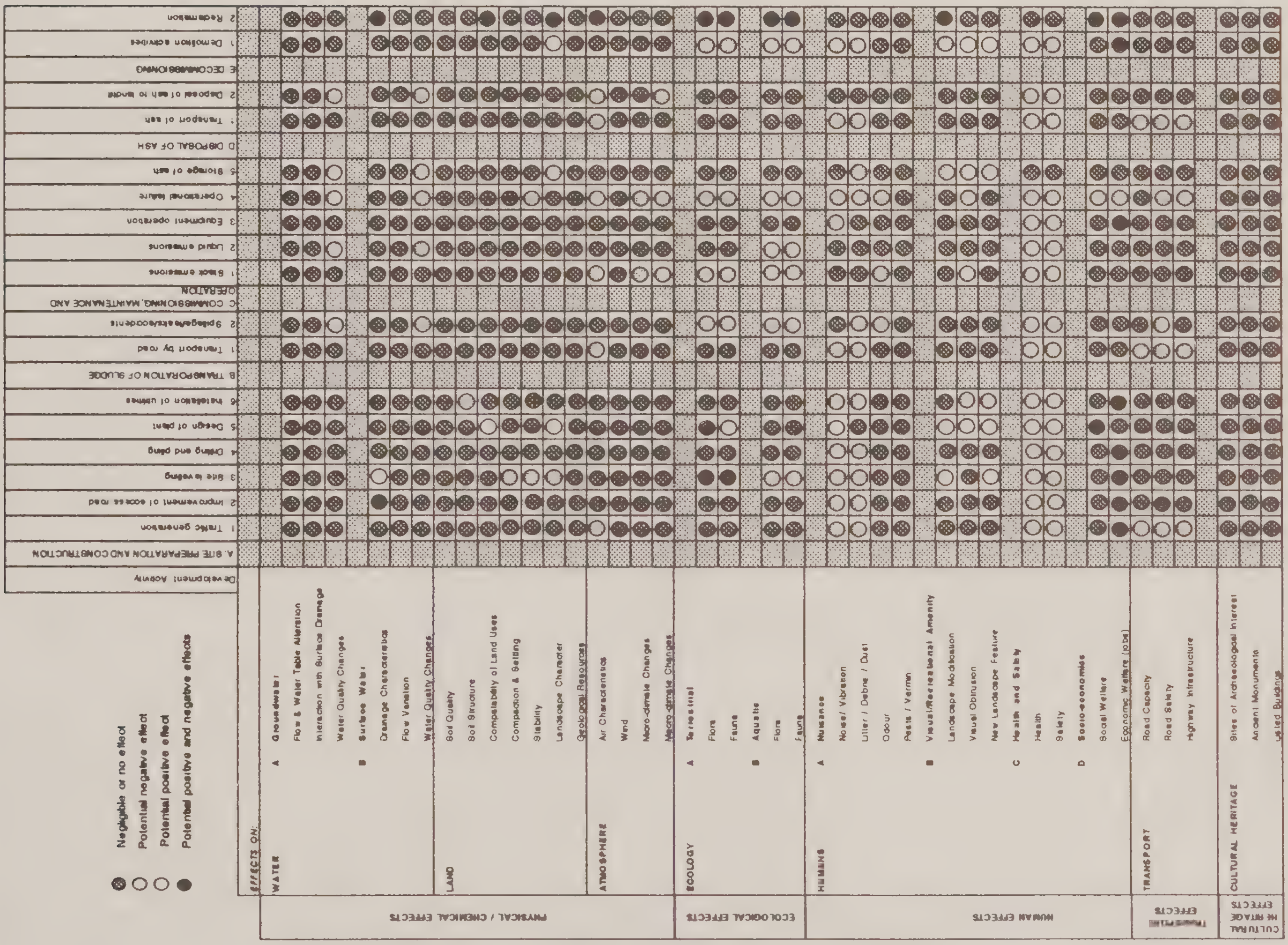
Impact Prediction and Measurement

The principal environmental impacts emanating from an incineration development include emissions to air and indirectly to soils with associated health implications, visual intrusion, nuisance (odour, noise, etc), vehicular movements, effects on flora and fauna, and socio-economic effects. Depending upon the environmental sensitivity of the development site, water impacts may also necessitate consideration. Ultimately, the environmental concerns depend upon the proposed environmental setting. In this instance, the proposed development site is within an industrialised area of the Belfast Harbour.

For the most part, chimney flue gas (stack) emissions in incinerator EIAs and their effects on human health, fauna and flora have received and occupied the greatest attention in the submitted EISs. Therefore, the principal study is an Air Quality Impact Assessment (AQIA). This involves not only identification, prediction and variables such as source emissions and meteorological conditions, but changes of air quality as a result of emissions from the proposed incinerator. The AQIA may broadly be divided into three stages (Harrop and Carpenter, 1992).

- Stage 1 — The Existing Baseline Situation;
- Stage 2 — Characterisation of Emission Sources; and
- Stage 3 — Assessment of Impact

Atmospheric dispersion models have been developed for a variety of pollutants, time scales and operational scenarios. Short-terms models are used to calculate concentrations of pollutants over a few minutes, hours or days, and can be employed to predict worst-case conditions (i.e. high pollution episodes). Long-term models are designed to predict seasonal or annual average concentrations, which are useful in studying potential chronic health effects, impacts on vegetation, materials and structures. Figure 2 shows the predicted long-term dispersion of ground level concentrations from the Belfast study.


◎ Negligible or no effect
○ Potential negative effect
○ Potential positive effect
● Potential positive and negative effects
Development Activity
A. SITE PREPARATION AND CONSTRUCTION
1 Traffic generation
2 Improvement of access road
3 Site levelling
4 Drilling and piling
5 Design of plant
6 Installation of utilities
B TRANSPORTATION OF SLUDGE
1 Transport by road
2 Spillages/leaks/accidents
C COMMISSIONING, MAINTENANCE AND OPERATION
1 Stack emissions
2 Liquid emissions
3 Equipment operation
4 Operational failure
5 Storage of ash
D DISPOSAL OF ASH
1 Transport of ash
2 Disposal of ash to landfill
E DECOMMISSIONING
1 Demolition activities
2 Reclamation
EFFECTS ON:
WATER
A Groundwater
Flow & Water Table Alteration
Interaction with Surface Drainage
Water Quality Changes
B Surface Water
Drainage Characteristics
Flow Variation
Water Quality Changes
LAND
Soil Quality
Soil Structure
Compatibility of Land Uses
Compaction & Settling
Stability
Landscape Character
Geological Resources
ATMOSPHERE
Air Characteristics
Wind
Macro-climate Changes
Micro-climate Changes
ECOLOGY
A Terrestrial
Flora
Fauna
B Aquatic
Flora
Fauna
HUMANS
A Nuisance
Noise/Vibration
Litter/Debris/Dust
Odour
Pests/Vermin
B Visual/Recreational Amenity
Landscape Modification
Visual Obtrusion
New Landscape Feature
C Health and Safety
Health
Safety
D Socio-economics
Social Welfare
Economic Welfare (Jobs)
TRANSPORT
Road Capacity
Road Safety
Highway Infrastructure
CULTURAL HERITAGE
Sites of Archaeological Interest
Ancient Monuments
Listed Buildings
PHYSICAL / CHEMICAL EFFECTS
ECOLOGICAL EFFECTS
HUMAN EFFECTS
TRANSPORT EFFECTS
CULTURAL HERITAGE EFFECTS

Summary of Key Environmental Issues:
Proposed Sewage Sludge Incinerator, Duncrue Street

Site preparation and construction of the incinerator

- ◎ Generation of construction traffic.
- ◎ Construction activities may generate noise, dust and vibration, and may be visually intrusive.
- ◎ Excavations, drilling and piling may affect surface and groundwater.
- ○ Construction activities may generate employment.

Transportation of sludge

- ◎ Generation of traffic to transport sludge.
- ◎ Effects on road capacity and safety.
- ◎ Generation of road traffic noise and vibration.
- ◎ Increased traffic exhaust emissions.
- ◎ Potential spillage or leaks of liquid sludge may affect surface and groundwater.

Commissioning, maintenance and operation

- ◎ Stack emissions may include heavy metals, carbon monoxide, particulates, acid gas and greenhouse gas emissions.
- ◎ Liquid emissions may contain potentially toxic constituents.
- ◎ Operation of equipment may generate noise.
- ◎ The stack, its emissions, and buildings on-site may be visually intrusive.
- ◎ Disposal of ash to landfill will create additional traffic and affect leachate composition at landfill sites.
- ○ Design of facility and landscape improvements will improve visual setting and amenity
- ○ The incinerator will form part of an integrated complex comprising the Duncrue Heritage Centre and Wildlife Area

Figure 1 A Simple Matrix for an Incinerator Development in Belfast, UK. (Water Executive of the Department of the Environment for Northern Ireland, 1994).

Impact Description and Evaluation

Maximum 1-hour and annual concentrations were used in the assessment from a baseline monitoring study and available air quality data for Belfast. The impact of emissions (assuming the plant was emitting to the maximum emission level allowed in the Her Majesty's Inspector of Pollution (HMIP), Guidance Note IPR 5/11) from the chimney were, by convention compared with short-term and long-term air quality criteria.

For potential carcinogens, potential risks were estimated as probabilities. It is customary in risk assessment to assume worst case exposure scenarios so as to be protective of public health. It was assumed, conservatively, that emissions of the carcinogenic contaminants were at the maximum limit permitted by the incinerator plant design criteria, and were continuous over 365 days per annum for 70 years, the average lifetime of a hypothetical exposed individual. Further, the individual was assumed to have spent an entire lifetime at the point of maximum impact inhaling the emissions from the incinerator and absorbing 100% of the material inhaled. This worst case scenario was used to predict the increased individual lifetime risk of developing cancer, to the hypothetical maximum exposed individual, as a result of inhalation of the

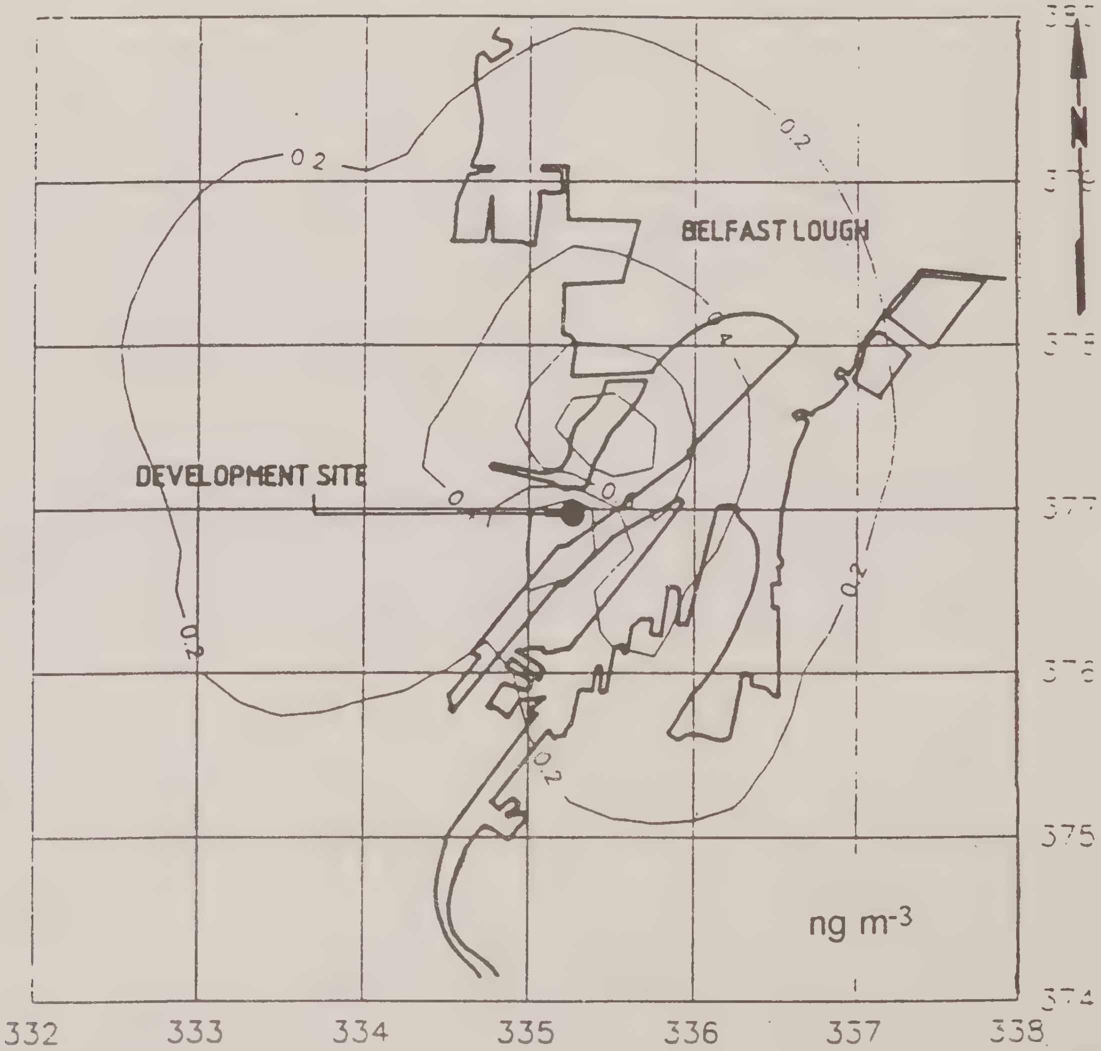


Figure 2 Predicted Ground Level Concentrations from the Incinerator (Department of the Environment for Northern Ireland 1994).

emissions. Hence the risk estimates produced are representative of extreme levels of exposure. Risk estimates were finally adjusted to cater for realistic exposure and absorption levels. Over a typical lifetime of 70 years the risks corresponded to a range of incremental values from 0.4×10^{-6} to 0.2×10^{-6} per year. These compare with a risk of 1 in 1000000 that by consensus represents a reasonable upper bound level, beyond which measures to achieve a further reduction in the risk would not be justified in terms of the benefit gained. The calculated risk range of 0.4×10^{-6} to 0.2×10^{-6} per year corresponds to risks of between 0.4 and 0.2 per million per year.

The EIA concluded that predicted increases in maximum short-term and long-term ground level concentrations were low compared to existing air quality levels. Existing and predicted ground level concentrations were below recommended air quality criteria with the exception of short-term levels for SO_2 which very occasionally exceeded the World Health Organisation air quality guideline. SO_2 levels in Belfast have shown a marked decrease in concentrations in recent years.

Presentation and Communication of Information

In conclusion, perhaps the most important activity in the Belfast EIA process was the ultimate presentation of the EIS. The EIS aids the decision-makers in their final decision relative to the particular project, and being a public document it would be scrutinised by interested agencies and groups. Canter (1991) summarises from other authors five basic principles to be remembered:

- always have in mind the audience of the report; in the case of an EIS assume the reader is intelligent but uninformed;
- decide on the purpose of report, to convey the environmental consequences of the proposed development;
- use simple and familiar language, the EIS requires the submission of a non-technical summary;
- ensure that the presentation of the report is well-structured; and
- make the report visually attractive.

Those criteria proved themselves to be essential during presentation of the Belfast EIS.

Acknowledgements

The authors would like to thank Mr. Henry Plester, Director of the Water Executive for the Department of the Environment for Northern Ireland for giving permission to use the case study in this article.

References

Canter L.W., Advanced Environmental Assessment Methods, Proceedings of the 13th International Seminar on Environmental Assessment and Management, Centre for Environmental Management and Planning, Aberdeen University, 1992.

Department of the Environment for Northern Ireland, Water Executive, Proposed Sewage Sludge Incinerator, Duncrue Sewage Treatment Works – Belfast, Environmental Statement, February 1994.

Department of the Environment, Environmental Assessment: A Guide to the Procedures, HMSO, London, 1989.

Harrop D.O. and Carpenter R.P., Methods for Assessing Air Quality Impact, Proceedings of the 59th Conference of the National Society for Clean Air and Environmental Protection, Bournemouth, 1992.

A DUST METER FOR MEASURING DUST DEPOSITION AND SOILING OF GLOSSY SURFACES

Michael J.R. Schwar, PhD, MSc, BSc, DIC, CPhys, MInstP

TBV Science

INTRODUCTION

The prototype dust meter described by Schwar[1,2] is proving to be a useful device for characterising dusty environments. Schwar[2] and Moorcroft and Laxen[3] have described some of these applications, and Moorcroft[4] has investigated how measured dust deposition or soiling readings relate to people's perception of dust nuisance. As a consequence of growing interest Jones[5] in association with Schwar, has developed and standardised its design and the meter is now commercially available from Diffusion Systems Ltd, UK.

The dust meter uses a clean microscope slide to simulate a glossy surface and act as a dust collector. The dustiness of the slide when exposed is quantified by measuring the reduction in specular reflectance relative to a clean unexposed reference slide. By using microscope slides as dust collectors it is possible to collect a vast number of samples for very little equipment cost outlay. The deposited dust can also be examined under an optical microscope to throw further light on the nature of the dust problem under investigation.

The simplicity of the dust meter should not belie the importance of following several critical quality control steps in order to keep the accuracy of measurements to within defined limits. The purpose of this paper is to describe these steps so existing and new users of the meter may conduct measurements in a standardised and consistent manner, thereby ensuring the comparability of results. If all the precautions described are followed, the limit of measurement is about 2 soiling units (2 su) or 2% relative to a reading 100% for a clean unexposed slide. The accuracy of measurements is better than ±2 su or ± 2%. These values apply to the routine use of the instrument; with care it may be possible to increase the sensitivity of the method by a factor of two or better.

DUST METER

The dust meter consists of an Optical Head connected to a Digital Visual Display via a flexible lead. The digital visual display is attached to a horizontal deck which has two side by side machined recesses to accommodate a Collector Slide and a Reference Slide. The base of the recesses comprises a black hole to prevent reflectances from the back of the slide holder. The optical head comprises a light source and detector with a 45° incidence/45° reflectance configuration. The output from the detector is adjusted to read 100.0 on the digital display when the optical head is placed in the recess over the reference slide, and 0.0 when it is placed over the recess without a slide. The dust deposition on, or soiling of the exposed collector slide is given by the reduction in reading when the optical head is transferred from the reference slide and placed in the recess over the collector slide. A reduction in reflectance, relative to a clean slide, of 1% represents an increase in soiling of 1 su.

SLIDE MANAGEMENT

Slide Selection

The meter is normally used in conjunction with Select Micro Slides (Washed) manufactured by Chance Proper Ltd to BS3836-1974, KTH260. The dimensions of these slides are 76mm × 26mm, 0.8/1.0mm thick. Other slides may be used providing they can be shown to be equivalent.

It is essential that slides selected for dust collection and reference purposes are thoroughly clean before use. The methods of cleaning should be by polishing both surfaces of the slide with lens tissue preferably after dipping the slide in Decon or acetone or similar cleaning fluids.

After cleaning sufficient collector and reference slides at least 5, or 10% of the slides (which ever is the greater), should have their relative reflectance measured using the meter. The purpose of this is to establish the variability in the reflectances of the cleaned slides. Any one of the cleaned slides can be used for this exercise as the reference slide. None of the measured reflectances should differ by more ±1% from the mean reflectance measurement. If any one slide differs from the mean by more than this all the slides must be recleaned until this condition is satisfied.

Alternatively, all slides may be measured and any slide whose individual reflectance differs from the mean of all slides by more than ±1% must be rejected or recleaned until the condition is satisfied.

Two slides should be selected from the batch of cleaned slides which have a measured reflectance close to the mean reflectance. One of these should be put to one side for use as the reference slide for subsequent deposition or soiling measurements. The other should be held in reserve in case the first becomes damaged. The reference slide should be assigned a unique reference number/label.

Slide Issue and Reception

Before the issue of slides for placing on site they should be uniquely labelled at one end. The exposure period will depend on local circumstances. However, for the purposes of standardisation an exposure period of one week is now routinely used irrespective of the activity or weather conditions. After exposure the slides are taken back to the laboratory for measurement. Cell Path boxes with space for up to five slides have proved quite convenient for this. Slides which are wet or overloaded should not be placed with other slides in the box. The underside and edges of a wet slide should first be dried.

If normal handling of a slide results in loss of deposited dust it should be discarded or, if a minimum deposition or soiling measurement is relevant to the study, this instability should be noted and mentioned when reporting the result. Generally deposited dust loadings have tended to be sufficiently low for the above instability not to be a problem. If on receiving the exposed slides the deposited dust causes an instability when locating the optical head it may be necessary to carefully remove the deposited dust from the area which comes into contact with the optical head. If in doubt do not remove any dust. Removal of dust should be noted and mentioned when reporting the result.

Slide Storage

In case it is necessary to repeat a measurement, exposed slides are normally stored in Cell Path boxes or equivalent for at least one year. Reference slides should be selected for each batch of collector slides. They should be labelled and a record kept of their use. It must be possible to trace a particular reflectance measurement back to the reference slide used, and any remeasurement should be carried out using the original reference slide.

SAMPLING

Plan

For ambient measurements collector slides should be positioned horizontally on surfaces approximately 1 to 2m above the ground. Sites should be chosen to be representative of dust deposition in the area. Sheltered locations such as, for example, underneath trees should normally be avoided.

For other measurements, the location of collector slides should be positioned in consultation with the client or sponsor of the study.

The slides may be attached to the underlying surface using, for example, two pea-sized pieces of "Blu Tac" stuck to the underside of the slide at each end. A gap under the slide allows water to flow away should the underlying surface become wet.

Exposure

Experience has shown that a sampling period of one week provides a useful time interval over which to carry out dust deposition and soiling measurement for a wide range of dusty activities irrespective of weather conditions. The exposure period need not be restricted to dry weather conditions. Indeed, the advantage of the method is that exposure conditions can accurately reflect real conditions which give rise to surface soiling and allows the net effect of dust deposition and cleansing and erosion to be measured.

Start and finish times should be recorded to the nearest quarter hour.

Reporting

Details of the location of the exposed slides, including any diagrams, or photographs should be reported, as should reference to the sampling plan used.

MEASUREMENT

Procedure

(a) Position the optical head over one of the slide recesses in the deck of the meter, and using the 'zero' control set the meter reading 0.0. Record meter reading.

(b) Place the reference slide in the reference slide recess and position the optical head over the reference slide. Using ‘coarse’ and ‘fine’ controls, set meter reading to 100.0. Record meter reading and the unique reference number of the reference slide.

(c) After carefully cleaning the underside of the exposed collector slide place it in the adjacent slide recess, and transfer the optical head from the reference slide to the collector slide. Record meter reading.

(d) Lift optical head and wipe its base to remove any dust which may have been picked up from the exposed collector slide.

(e) Return optical head to the reference slide and record reading. (This completes the first cycle of measurements, i.e. reference reading, collector reading and reference reading.)

(f) Keeping the optical head over the reference slide record reading again. There is no need to readjust the reference reading using the fine and coarse controls. Repeat steps (c) and (d) twice, recording the readings as indicated in Table 1.

Table 1: Suggested Layout for Recording Deposition/Soiling Measurements

Column						
[1] *Zero set*	[2] *Ref slide reading*	[3] *Col slide reading*	[4] *Ref slide reading*	[5] *Reflectance value*	[6/7] *Reflectance meas’ment/Std dev %*	[8] *Deposition or soiling meas’ment su*
00.0	100.0	63.7	99.1	63.99	63.80	36.20
	99.1	63.4	99.5	63.85	/0.22	
	99.9	63.5	99.9	63.56		

[1] Zero set reading at beginning of measurement session and at end showing zero drift, if any.
[2] First reference slide reading to one decimal place.
[3] Collector slide reading to one decimal place.
[4] Second reference slide reading to one decimal place.
[5] Reflectance value of collector slide to two decimal places calculated using the expression $([2] + [4] \div 2 \div [3])^1 \times 100$
[6] Arithmetic mean of three successive reflectance values to two decimal places.
[7] Standard deviation of values used to calculate [6] using formula applicable to small samples, i.e. (n-1) formula.
[8] 100.00 -[6]

Quality Checks

The following quality checks are recommended:

(a) The highest and lowest reflectance value of a clean collector slide should differ by no more than ±1% from the mean value for all the collector slides.

(b) Two slides shall be selected for reference purposes which have reflectance values close to the mean reflectance and differing by no more the 0.2%.

(c) Exposure periods shall be recorded to the nearest 0.25 h. The total exposure period should be normally about one week (ca 168h).

(d) Zero drift over the duration of a batch of measurements should not exceed ±0.2%.

(e) The uniformity and dimensions of the optical should be periodically checked, and any irregularities reported to the manufacturer.

(f) If the reflectance of three successive readings for a given collector slide gives rise to a standard deviation exceeding 0.5% all three readings should be rejected and the measurement repeated.

(g) The response of the photodetector should be periodically checked using a reference slide of known or defined or stable reflectance. Measured reflectances should be to within ±2% of the specified values. A glass wedge has proved suitable for this purpose[6].

(h) The meter reading drift should not exceed 4% per hour. A drift of this order should be referred to the manufacturer.

(i) One in 50 (i.e. 2%) of exposed slides should be remeasured. If the results of these duplicate measurements differ by more than 4% the matter should be investigated. (a) to (e) should be checked each time the Dust Meter is used. (d) to (g) should be checked at six monthly intervals. (h) need only be checked if check (f) consistently shows the standard deviation exceeds 0.5%.

ACCURACY

Statistics

The accuracy of the dust deposition/soiling measurements is limited by the cleanliness of the slides before exposure and the cleanliness of the reference slide. It is also governed by the inherent reproducibility of a measurement.

By way of illustration Table 2 summarises the results of three sets of measurements made on:

(a) Slides taken straight from a fresh box of Chance Proper Select Micro Slides (10 slides; 10 measurements relative to a slide from the same box cleaned in acetone and polished with lens tissue).

(b) The same slides after all having been cleaned and polished (10 slides; 10 measurements).

(c) A single soiled slide (1 slide; 10 measurements).

Table 2: Results of Reflectance Value Measurements for Sets of 'Clean' and Soiled Slides.

Set	Sample size	Reflectance Values				
		Lowest	Highest	Mean	Std. dev.	Highest less lowest
(a)	10	95.92	98.83	97.33	0.97	2.91
(b)	10	99.13	100.20	100.34	0.47	1.07
(c)	10	67.96	68.73	68.41	0.26	0.77

The Limit of Detection (LoD) is given by $LoD = t_r S_r + t_s S_s$, where

S_r is the standard deviation associated with the reference slide, and S_s is the standard deviation associated with the soiled slide. t_r and t_s represent the Student 't' value (one sided test) at the 5% significance level corresponding to the degrees of freedom applicable to the reference and soiled slides respectively. In this case S_r and S_s are 0.47 and 0.26 respectively, and t_r and t_s are both 1.833. Substituting these into the above equation gives for the LoD a value of 1.34.

The Repeatability of Measurement (R) is given by

$R = t_s \sqrt{2}\, S_s$, where

t_s represents the Student 't' value (two sided test) for the soiled slides, and in this case is equal to 2.27. Substituting this into the above equation for R gives a value of 0.83. For the examples shown, the Dust Meter has a LoD of between 1 and 2 soiling units, and a precision of better than 1 soiling unit.

Reporting

For reporting purposes it is proposed that the Limit Detection be quoted as 2 soiling units with a precision of better than 1 soiling unit. Dust deposition/soiling measurements should be reported to the nearest whole number.

NAMAS ACCREDITATION

The Dust Meter, and sampling and measurement system described here, has been scrutinised under the National Accreditation Measurement Scheme and TBV Science is NAMAS Accredited for the 'Sampling and Evaluation of Dust Deposition (Soiling)' using this meter.

REFERENCES

1. Brooks, K. and Schwar, M.J.R. (1987). Dust deposition and the soiling of glossy surfaces. Environmental Pollution, 43, 129-141.
2. Schwar, M.J.R. and Brooks, K. (1988). Not so dusty. London Environmental Bulletin, 4, Spring 1988, 18-19.
3. Moorcroft, J.S. and Laxen, D.P.H. (1990). Assessment of dust nuisance. Environmental Health, August 1990, 215-217.
4. Moorcroft, J.S. and Eyre, S. (1989). Assessment of dust nuisance: measurement and guidelines. London Environmental Supplement, No. 19, Spring 1989, 1-11.
5. Jones, W. Diffusion System Ltd., 43 Rosebank Road, Hanwell, London W7 2EW, UK.
6. Schwar, M.J.R. — details available on request.

A STUDY OF ENVIRONMENTAL LOW FREQUENCY NOISE

J.W. Sargent, MIOA

©Crown Copyright 1994 – Building Research Establishement

Summary

This paper outlines a study on low frequency noise carried out for the Local Environment Quality Division of the Department of the Environment, summarises its findings and makes recommendations.

Over 270 people who suffer inside their homes, from what they describe as low frequency noise, provided details about the noise they hear. About 10% of these cases were investigated in more detail.

In only three cases could a noise be clearly detected within the complainant's home that related conclusively to the noise they complained about.

Ten complainants underwent audiological investigations. Of these –

★ Three cases were indicative of hypersensitivity to the noise of their complaint;
★ One case was indicative of hyperacusis;
★ Three cases were indicative of tinnitus;
★ One case indicated that the noise measured in the complainant's dwelling was the reason for the complaint.

In the remaining two cases the investigated persons had become convinced that they could hear the noise their partner experienced, but their partners were found to be suffering from tinnitus.

From the experience gained during this work, a proposed protocol for Environmental Health Officers and other professionals carrying out investigations into complaints of low frequency noise has been produced and is included as an annex to this paper.

Introduction

The Department of the Environment has received a small but steady flow of complaints about low frequency noise for many years. In 1988 DOE funded a review of the disturbance caused by low frequency noise, which included a survey of the complaints received by local authorities. The survey indicated that the total number of complaints to all local authorities at that time was about 500 per year. Positive identification of the noise source causing these complaints was made in slightly less than 90% of cases.

In 1992 a research contract, under the direction of the Building Research Establishment, was placed with Sound Research Laboratories to investigate some of the unsolved cases and, as a result of the experience gained, provided practical guidance for those professionals who have to deal with similar problems. Sound Research Laboratories sub-contracted audiological studies on a sample of the complainants to the Audiological Unit of Addenbrookes Hospital.

The Study Sample

Contact was established with over 380 complainants. Some of these were people that contacted Sound Research Laboratories (SRL), the Building Research Establishment (BRE) or the Department of the Environment directly as a result of the publicity. However the majority were referred by Environmental Health Officers (EHOs) who had first investigated the complaint.

A simple questionnaire was produced to gather the relevant information on each case in a consistent format which could be easily accessed. A total of 385 questionnaires were sent out during the project and of these 273 were returned completed. In these questionnaires a total of 295 sufferers were listed. Of the sufferers 111 were male and 184 female, that is 38% male and 62% female. The most common descriptions of the noise used the words ‘droning’, ‘distant plane’, ‘lorry’, ‘diesel engine’, ‘generator’ and ‘motor hum’. Other words used are ‘turbine’, ‘whine’, ‘high pitched “sissing”’, ‘whistle’ and ‘hissing’. Some descriptions use a number of these words. In a few cases the sufferers have said it was too difficult to describe.

The sample for site investigation was chosen using information from questionnaire data. The sample includes male and female complainants. Cases were chosen in various geographical areas from the south coast of England to Ayrshire in Scotland and from Bristol in the west of England to Ipswich in the east. Both rural and urban cases were included in the sample. As the work progressed investigations were concentrated on cases where more than one person in the same household were reported to have heard the noise. Cases where, from details given, the complainant was suspected of suffering from tinnitus were not included in the sample.

Site Investigations

Investigations were generally conducted within the sufferer’s property as this was usually the place where the noise was heard. The investigations would normally be made in the evening and sometimes into the early hours of the morning as in most cases it was reported that the noise was less noticeable during the day.

The outline of the investigation procedure was as follows:

(i) Initial interview with sufferer.

(ii) Investigator listens for noise.

(iii) Tests, such as tone matching, to try to establish more about the nature of the noise heard.

(iv) Measurements of the ambient noise levels to try to identify the specific noise causing the noise nuisance. Narrow band ($\frac{1}{24}$th octave) real time analysis was normally used however in some cases an FFT (Fast Fourier Transform) Analyser was used.

A total of 31 cases were investigated as part of this project, 26 cases by SRL and a further 5 by BRE. Experience of a further two cases carried out by SRL for other clients has also been used with the clients’ permission.

Of the 26 cases investigated by SRL there were only three cases where the noise could be positively detected by measurement and/or was audible to the investigator. In two cases the noise complained of was consistent with the 100 Hz noise emitted by electrical sub-stations nearby. In the other case there was a narrow band of measured noise centred on 104 Hz which although at a low level was audible to the investigator. This frequency being slightly higher than 100 Hz is unlikely to come from an electricity sub-station and the noise was still found to be present when the local electricity board switched off the nearby sub-station. This noise was not audible or detectable outside the house. There were another seven cases where for a variety of reasons there was some evidence to suggest that a low level low frequency noise may occasionally be present that could be related to the noise complained of. If noise measurement had been possible over a long period of time it may have been possible in some of these cases to identify the noise that related to the source of the problem. In most of these cases it is suspected tha the sufferer has been sensitised to the noise at some time in the past when it was louder and more continuous. In none of the cases investigated by BRE could a noise be detected in the complainant's residence that related to the noise heard by the complainant. Although in one case it was thought possible that a low level noise from a local pumping station may have been present at times in the past and sensitised the complainant.

In the two cases SRL carried out for other clients there was little doubt about the source of the noise, measurements being used to confirm the sources and to provide information on which to base recommendations.

Audiological Investigations

Comprehensive audiological testing was undertaken with ten complainants and for two cases of non-complaining spouse or family member. In only three cases was tinnitus indicated.

True hyperacusis, being hypersensitivity and annoyance from all sounds, was indicated in one case, but an additional three showed specific hypersensitivity to the noise of their complaint. In one case there was strong evidence that a noise was indeed present as the noise was heard by the whole family and only in one bedroom. Subsequent measurements confirmed the presence of a noise in this particular room. In one case the wife was the principal complainant, but during audiological tests she was able to hear the noise of complaint clearly in a sound proof room and was therefore said to have tinnitus. The husband was also a complainant, but he had normal hearing and was unable to hear the sound in the sound proof room. The conclusion made was that his wife's complaint had drawn the husband's attention to low frequency sound in the environment, and so he had become convinced of the complaint and shared the distress. There was also a second case with similar circumstances and symptoms.

The report from the audiological scientists concludes that categorising low frequency noise (LFN) complainants would be spurious if it did not lead one to options for treatment of therapy. A detailed consideration of this area is far beyond the scope of the original brief to the audiologists involved, but a thumbnail sketch may be helpful. A patient with tinnitus may be helped with a hearing aid or white noise generator (previously known as a tinnitus masker). The use of white noise generators in the treatment of hyperacusis is becoming popular and has seen some success. In cases of specific hypersensitivity then cognitive therapy may be utilised.

Conclusions

From the results of this study low frequency noise complaints would appear to fall into the following main categories:

1. Complaints where noise relating to the noise complained of can be measured.
2. Complaints where the complainant is suffering from tinnitus.
3. Complaints where the complainant is suffering from hyperacusis.
4. Complaints where the complainant would appear to be hypersensitive to the specific noise of their complaint and where no noise relating to that experienced by the complainant can be measured.

Some of the cases in the first category will have noise levels which are lower than those generally regarded as likely to cause a nuisance.

Cases in the second and third categories relate to medical diagnosis and should lead to medical care for the complainant. The suffering of one person may affect other family members.

Complaints that fall into the fourth category will need further research as it is not clear if the cause is in some way related to the noise climate within the complainant's dwelling, or solely a medical condition, or a combination of both.

Recommendations

As a result of the experience gained from this research the following recommendations are made:

- That EHOs, acoustic consultants or others investigating LFN complaints have normal hearing.
- That LFN complainants are treated with respect and that care is taken not to speculate about sources or diagnoses.
- That comprehensive noise surveys be undertaken before an audiological opinion is sought and that these be available to the audiological scientist. A suggested protocol for carrying out low frequency noise investigations is given in annex 1.
- That the Department of Health consider how specialist tinnitus clinics might be involved in the treatment and therapy of LFN complainants.
- That therapy and treatment be available to these patients who are suffering considerable and genuine distress.
- That low frequency noise complaints to local authorities should be monitored to assess the continuing scale of the problem.
- That further investigations are carried out on complaints of low frequency noise, to

build up a clearer picture of the causes of complaint, particularly in cases where the complainant appears to show a hypersensitivity to the noise of their complaint but no noise relating to this can be measured.

ANNEX 1

PROPOSED LOW FREQUENCY NOISE INVESTIGATION PROTOCOL

The professional investigator's first visit must be handled with care, particularly if no noise is obvious at this time. The investigator should treat the complainant with respect. Any hostility created during the first visit will probably cause an entrenched reaction that will continue for a considerable time, preventing the best course of action being taken early. The raising of possible diagnoses or sources with the complainant can be very unhelpful unless, or until, there is positive proof of the source of the problem.

A "Decision Tree" has been developed, which should be seen as a guide, to be used in conjunction with the following recommended approach. It does not guarantee the outcome of a low frequency noise investigation and a number of decisions will have to be taken by the professional based on what they find at the time. The "Decision Tree" is shown in Fig. 1.

Recommended Investigation Protocol

(i) Visit Sufferer

Keep an open mind, discuss the problem with the sufferer including the history, background details and the way the sufferer perceives the noise.

The history should include the following:

- Start of the complaint
- Type of noise heard
- Duration of noise
- Complainant's belief about source
- Effect of complaint on quality of life
- Do family members hear the noise?
- Do neighbours hear the noise?
- Is the complainant sensitive to other sources of noise?

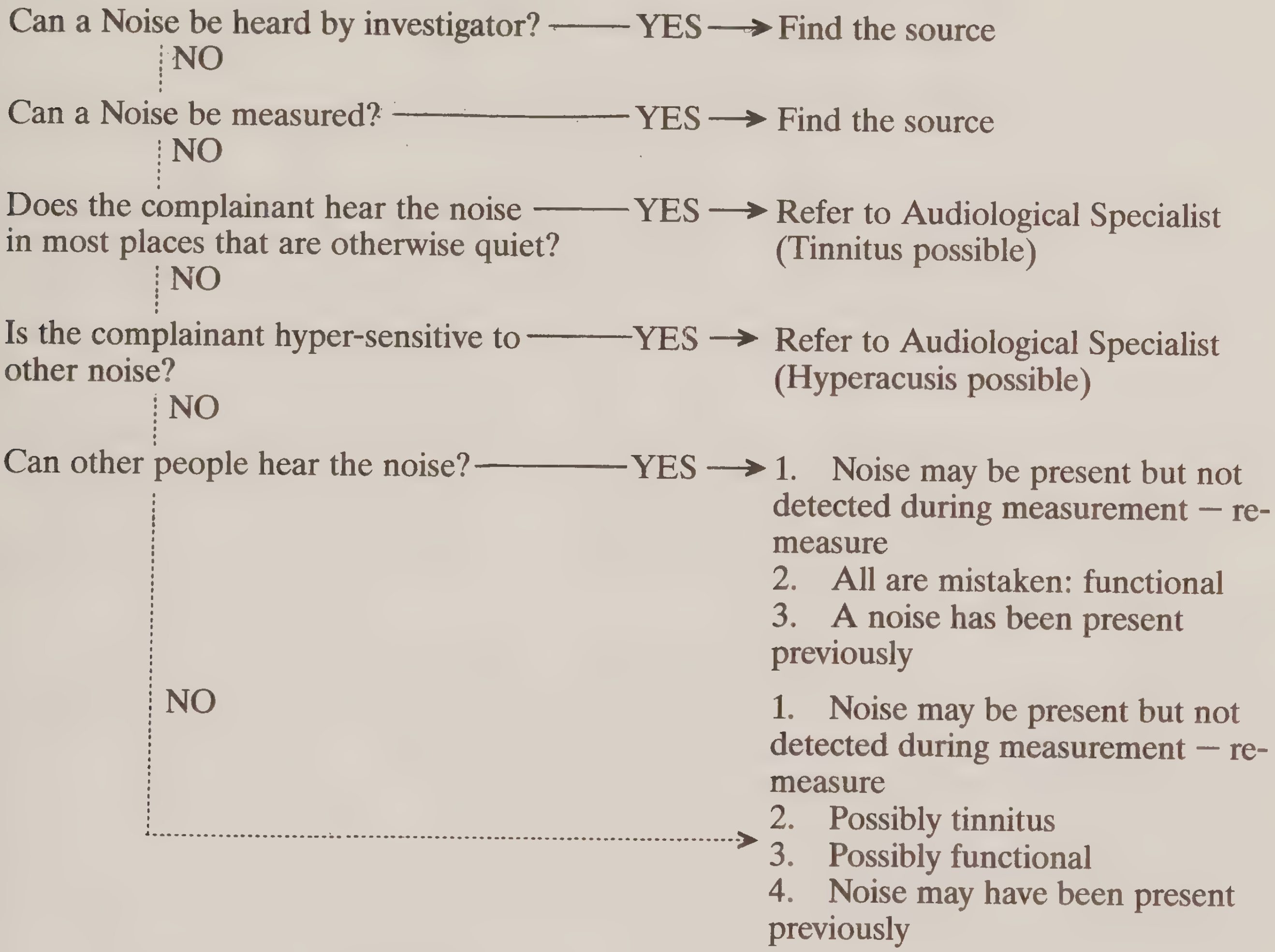
If there has been any history of noise nuisance problems in the area where the sufferer resides then the local environmental health department is likely to be aware of these problems.

(ii) Listen for Noise

The investigator should have normal hearing and listen carefully for the noise causing the complaint. Make sure that the complainant can clearly hear the noise at the time the investigation is carried out. This will often mean carrying out investigations during the evening, or at night, when other intrusive noise is at a low level.

If the noise complained of is heard then measurements can be carried out immediately and appropriate action considered. However, it is expected that a lot of these problems will fall outside the normal bounds of statutory legislation.

Figure 1: Decision Tree for Low Frequency Noise


Can a Noise be heard by investigator?
YES
Find the source
NO
Can a Noise be measured?
YES
Find the source
NO
Does the complainant hear the noise in most places that are otherwise quiet?
YES
Refer to Audiological Specialist (Tinnitus possible)
NO
Is the complainant hyper-sensitive to other noise?
YES
Refer to Audiological Specialist (Hyperacusis possible)
NO
Can other people hear the noise?
YES
1. Noise may be present but not detected during measurement — re-measure
2. All are mistaken: functional
3. A noise has been present previously
NO
1. Noise may be present but not detected during measurement — re-measure
2. Possibly tinnitus
3. Possibly functional
4. Noise may have been present previously

Brief descriptions of terms used above

Tinnitus: Any sound heard by the complainant that is generated by their auditory system.

Hyperacusis: Abnormal discomfort caused by sounds that are usually tolerable to other listeners.

Functional: A complainant has become convinced of the presence of a noise when none is in fact present. This is not indicative of psychological abnormality.

If the noise complained of cannot be heard by the investigator, noise measurements will need to be taken to ascertain whether or not there is a noise present that relates to that heard by the complainant.

(iii) Noise Measurements

It is considered extremely unlikely that a conventional sound level meter will be adequate to investigate low frequency noise complaints and the use of such equipment is not advisable. Therefore the investigator should obtain a frequency analyser, which if it can operate in real time and has narrow band capability (at least $\frac{1}{24}$th octave bandwidth) will allow the investigator to observe the characteristics of the ambient noise prevailing at the time.

Characteristics should be looked for that relate to the noise experienced by the complainants at the time of the measurement such as increases and decreases in the intensity of the noise, and places in the dwelling where the noise is loudest.

Observing the frequency spectrum in real time can give a significant amount of information, which would be lost if only a time average was used. Modulation at a particular frequency associated with "beating" can be seen easily in real time and may guide the investigator towards what to look for as a possible source.

(iv) If Nothing is Found

If no noise is heard or measured that relates to that heard by the complainant then one must carefully consider what to do. If it is felt that the measurement has been undertaken at a time when the noise was not at its worst, then another visit will be required. The possibility of the complaint relating to a previous source that has now abated should also be borne in mind.

If the investigator is convinced that there is no noise either heard or measured that relates to the complaint then the complainant needs to be referred to an audiological specialist. The "Decision Tree" is provided for the guidance of the investigator. Any diagnosis about the complainant's hearing system is clearly outside the competence of most investigators and opinions about the complainant's hearing should be avoided. In particular, the sufferer should not be told thay have tinnitus and told to go to the nearest ear, nose and throat hospital. Instead, they should be told that the investigator has not been able to measure the noise which they have described and they feel that the sufferer should be examined by an audiological specialist, as their hearing system may be involved in the complaint.

Expertise to deal with such cases would not be found in most Ear, Nose and Throat Departments or Audiology Units and referral to such agencies may compound any problem. Specialist Tinnitus/Hyperacusis Clinics, such as are found in London (UCH/Middlesex), Nottingham (General Hospital) and Cambridge (Addenbrookes) are known to have the appropriate expertise.

NEIGHBOUR NOISE PROBLEMS: WHAT IS THE PLACE OF MEDIATION?

Paul Holder

Conflict Resolution Training and Consultancy

Introduction

The turning of the year is a time for reflection and making new plans. 1994 was a year in which domestic noise problems received a good deal of attention. The value of mediation in resolving neighbour disputes also became a hot topic. Media coverage has been widespread, the government has been active, and there has been lively discussion within the environmental health profession. As a result, I expect that in 1995, many local authorities will be amending their policy and procedure on neighbour noise and wondering if and how mediation can be of benefit.

Objective of a Domestic Noise Service

Why do local authorities provide a domestic noise service? Your first answer might be, "because it has a statutory duty to do so", which of course is true. With this uppermost in mind noise control policy, and procedure has tended to be written, quite rightly, around the prevailing legislation. Unfortunately formal action tends to be expensive, and runs into the practical difficulties of collecting evidence especially in the domestic situation. However enforcement is essential to protect citizens rights. Environmental health departments have been developing strategies for increasing their effectiveness in enforcement by seizing equipment, carrying out works in default, developing good relations with the local judiciary and so forth.

Many environmental health staff state their noise objective simply as being to resolve noise complaints. Interestingly working practice indicates the importance of informal approaches. Staff tell me that a rule of thumb they use is to try and secure informal resolutions to noise problems agreeably between the parties involved, reserving formal action for those cases where people refuse to see reason. Indeed less than 5% of domestic noise complaints result in formal action[1]. As one EH officer said "we would not be doing our job properly if the figure was higher". Unless this informal approach is reflected in the department's objectives and procedures much of the good work being done may be unwittingly undervalued.

What are these formal and informal approaches trying to achieve? A policy document might state the department's objective as: *To help resolve neighbour noise problems by providing a domestic noise service which responds effectively and efficiently to requests for service.*

In fact there are several interests that a noise service is attempting to balance which I have categorised as:

(i) Meeting prescribed statutory duties, eg EPA, NASNA, etc.
(ii) Satisfying the customer, ie. directly, over the substantive and emotional aspects of individual noise complaints, and indirectly, through voters' desire to have a cost effective service.

(iii) Meeting directives and advice from outside bodies eg EU, government, court judgment, ombudsman etc.
(iv) Serving the interests of the organisation and professionals involved eg controlling local environmental quality, performance indicators, council members, etc.

These interests are not all compatible, and I am curious to know how clearly departments have integrated the interests into a coherent direction and allocated resources accordingly.

What Are The Blocks to Using Mediation?

Mediation is a non legal process which used appropriately and with skill is a powerful conflict resolution tool. It can significantly increase the effectiveness of informal approaches to the resolution of noise complaints. An increasing number of environmental health departments are interested in using mediation since it makes common sense to many staff. The NSCA is recommending that arrangements be made to secure mediation services[2]. The main obstacle to this in many areas is the lack of existing mediation services locally. The number of services is growing at an increasing rate but as yet there are about 40 services operational.

For authorities unsure how to go about securing mediation services or lacking time to progress plans, then several sources of help are available:

(i) Mediation UK, a registered charity that is the umbrella organisation for conflict resolution initiatives, publish a guide to starting community mediation services[3], and keep a record of local contact people with an interest in mediation, as well as collating information on existing services.
(ii) In addition the author is one of several consultants specialising in training and advice to local authorities on setting up new mediation services tailored to local needs. It can be useful when putting proposals to elected members to bring in a specialist, experienced in the field, who can make a convincing presentation, and can answer questions.
(iii) The government too, is encouraging local authorities to consider mediation and an information pack was circulated by the DoE[4] in November 1994.

Setting up a new mediation service requires a financial investment. Council members may be uncertain as to the costs and benefits of using mediation. The main benefits of a mediation service to an environmental health department are (i) increased efficiency of service by targeting resources appropriately, ie diverting suitable cases to trained volunteer mediators, releasing resources for environmental health staff to tackle statutory work; (ii) improved customer satisfaction through the use of volunteers who have the time to listen to people and take account of the various factors often relevant to the domestic situation[5].

Cost benefit arguments will probably have to be made on a qualitative rather than quantitative basis at present. For whilst it is straightforward to produce a budget for the cost side of the equation there is a lack of quantitative information on the benefit side. This is due in part to the lack of funding available to evaluate community mediation services. However local authorities are also new to the monitoring process, and a number of environmental health departments have told me that they do not know how much domestic noise cases cost them or what the profile of that spending is.

The rational way to describe the benefit side of the equation is in terms of its contribution towards meeting the objectives of the local authority's noise service. For this reason the objectives need to be stated in terms which specify how they are to be measured. These measures are not to be confused with the performance indicators collected for the Citizens Charter. Chosen well the measures can serve the interests of the organisation by valuing staff contributions that are helping to meet departmental objectives. It is common for output measures to be used by staff as a lowest common denominator when prioritising work when under pressure, so if they only reflect, say, meeting the statutory requirements then the service will slew towards this aspect irrespective of the other objectives. Simple quantitative and/or qualitative measurements that reflect working practice are the most effective to start with.

The cost of a new service could be spread between environmental health and housing departments since benefits will accrue to both. However these departments often operate autonomously or sometimes competitively, which means that a collaborative mediation venture will require senior staff to convince themselves that a greater interest will be served by joint action.

Where mediation services do exist local authorities and mediation organisations are sometimes working in isolation. This is now changing as service level agreements are being negotiated. Through partnerships mediation services gain confidence that their referral rate is matched by financial backing and local authorities gain confidence in the professional abilities of an independent voluntary organisation. For example Bristol's independent Noise Counselling Service drew up a referral document[6] with the city's environmental health department covering: the aims of the service, typical referral situations, the referral mechanism, a case allocation procedure, statements on confidentiality and communication, response times, and service capacity. In addition time was spent by both parties developing a good working relationship.

Model of a Domestic Noise Service

The value of mediation is in strengthening the success of informal approaches to noise complaints. Its value to a local authority can be appreciated when integrated into a coherent noise strategy as shown in the diagram.

There are resource constraints that limit the total expenditure available to deal with the large number of noise complaints. Each of the processes shown in the diagram can be costed out individually including the contribution to supporting an independent mediation service. A cost effective noise service would then encourage the majority of complainants through lowest cost routes in pursuit of the overall objective of the service. Any filter use to constrain costs should be devised to be consistent with the objectives of the service rather than for administrative convenience.

For example survey results show that a low proportion of noise complainants 15%[7] to 30%[8] talked directly to their neighbour before complaining to an authority. Thus it would seem cost effective to provide advice and support that would help complainants make direct contact with their neighbour before further involvement from the noise service.

The reception stage is a crucial point of customer care. Complainants tend to form judgements about the quality of a service very quickly on first contact and it can be difficult to change these later. Reception is also the point when complainants are likely to be emotionally charged. It is important to acknowledge the emotional tone received by listening and empathising in addition to taking details of the nature of the complaint. The options for formal or informal action can then be discussed together with likely outcomes.

The reception stage is partly an educational experience for the client. A reception that educates primarily about the procedures of statutory nuisance action will lead the client immediately into thinking about resolutions that will be expensive for the authority. Whereas by discussing several options, a low cost plan of action is more likely to be agreed that will satisfy the client's interests.

A Case in Point

It is the daily reality of a service that is important. So perhaps I can leave you with a typical noise complaint and some questions to bring the issues in this paper down to ground.

The Smiths are alleging nuisance from heavy bass thump, thump through the party wall, engine revving and exhaust fumes from next door's car repairs, and three cats whom seem to be trained to use their garden as a toilet.

Please stop for a moment and imagine you are a noise control officer having a busy week. What would your response be? What possible outcomes might result from this intervention, good and bad? What are the costs and benefits of this approach.?

What you do not know is that Mr and Mrs Smith are incomers from another part of the country (on a council estate of established residents). They moved because of Mr Smith's job but subsequently he was made redundant. The move has unsettled Tom (14), one of their three children, who was already having problems at his old school and has been excluded from the estate's school twice. The Andersons next door are a large family who have bought their house from the council.

What would you guess might be important for the Smiths in getting a response that will leave them satisfied? Do the objectives of your domestic noise service cater for this typical case? Would knowing the extra information about the Smiths make a difference to the way you handled the case? What kind of action might achieve a low cost resolution in this case?

Summary

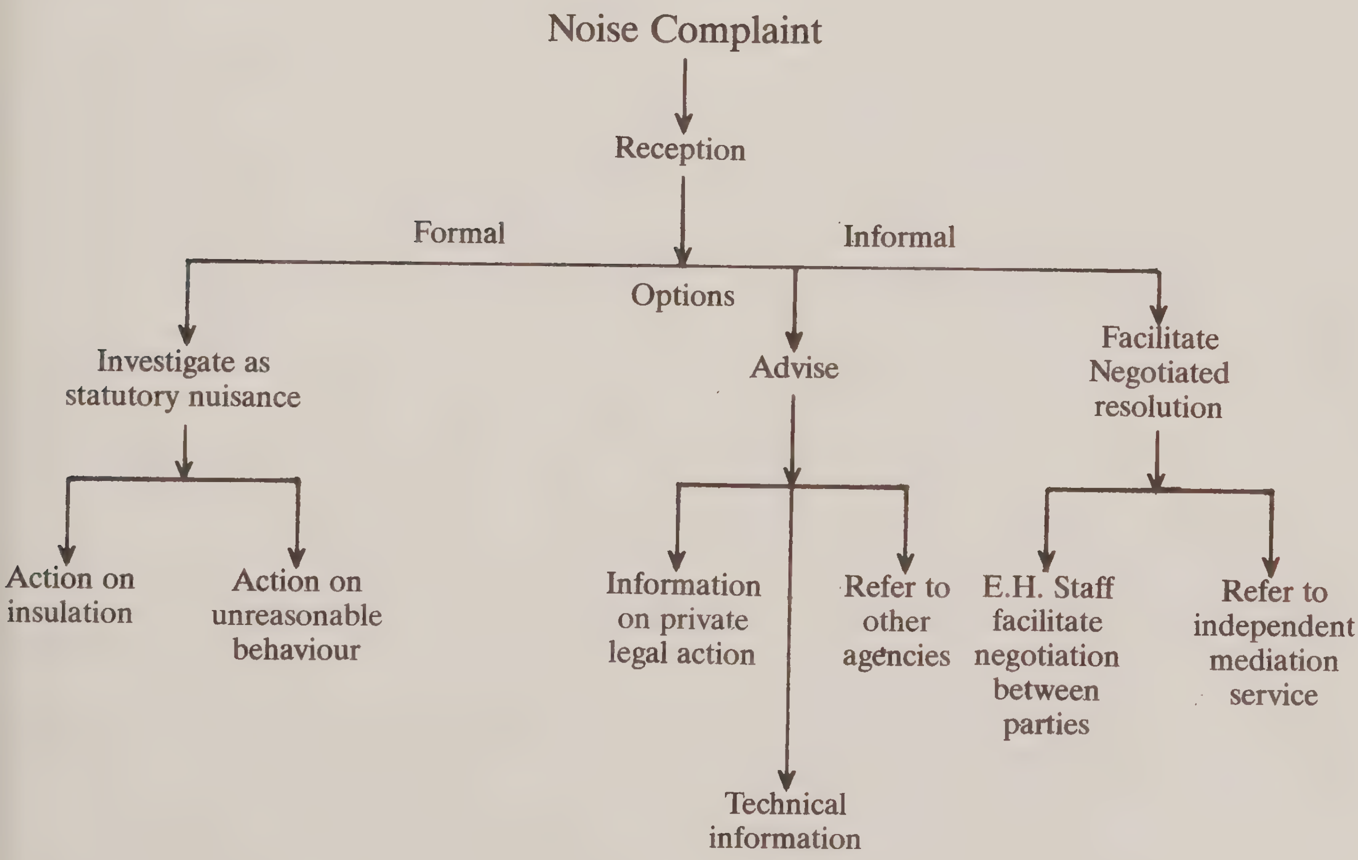
The value of mediation is in improving the effectiveness of a domestic noise service by strengthening informal resolutions to noise complaints. A well structured noise service will integrate mediation into a coherent strategy whose objectives are explicit, measurable, and take account of the need to meet statutory duties and give customer satisfaction in a value for money way. With the present state of development the benefits of mediation can best be argued qualitatively, and help is available for local authorities who are interested in following the government's recommendation to consider the use of mediation.

References

1. "Annual report" 1992/3, Institution of Environmental Health Officers, IEHO.
2. "Neighbour noise problems: NSCA local authority guidelines" 1994, National Society for the Protection of Clean Air and Environmental Protection, NSCA.
3. "A guide to starting a community mediation service", 1993, Mediation UK, 82A Gloucester Road, Bishopston, Bristol BS7 8BN. Tel: (0117) 924 1234.
4. "Mediation: benefits and practice – Information for those considering mediation as a way of resolving neighbour disputes" 1994, The Department of the Environment.
5. "The future for noise mediation", Paper given to NSCA noise control seminar, Feb 1994, by Paul Holder.
6. "Noise Counselling Service – final report", 1994, Paul Holder, Bristol Mediation, 82A Gloucester Road, Bishopston, Bristol BS7 8BN. Tel: (0177) 924 45500.
7. "Neighbours, nuisance, and mediation – a study for Hackney Housing" 1994, John Crawley, Conflict Management Plus.
8. "Effects of environmental noise on people at home" 1993, Building Research Establishment information paper 22/93, HMSO.

Paul Holder and Conflict Resolution Training and Consultancy can be contacted at, 31 Kennington Avenue, Bishopston, Bristol BS7 9EU. Tel: (0117) 924 6868.

Coherent Strategy for Handling Domestic Noise Complaints


Noise Complaint
Reception
Formal
Informal
Options
Investigate as statutory nuisance
Advise
Facilitate Negotiated resolution
Action on insulation
Action on unreasonable behaviour
Information on private legal action
Refer to other agencies
E.H. Staff facilitate negotiation between parties
Refer to independent mediation service
Technical information

UPDATE

ENVIRONMENT BILL

In December 1994, the *Environment Bill* was introduced into the House of Lords. The main provisions of the Bill of relevance to pollution control are the following:

- **Environment Agencies, England & Wales and Scotland:** Part I of the Bill establishes the Agencies and sets out their functions. In England & Wales the Agency will assume all the functions of HMIP, NRA, waste regulation authorities and the London Waste Regulation Authority, as well as certain functions of the Secretary of State. The NRA and LWRA will both be abolished. In Scotland the Agency (SEPA) will assume the functions of HMIPI, the river purification boards, the local authorities in respect of waste regulation and air pollution control and the Secretary of State in respect of powers to create smoke control areas. The RPBs are to be dissolved.

Both Agencies are charged with using their pollution control powers to prevent or minimise, or remedy or mitigate the effects of pollution on the environment; and to compile information relating to pollution and to ensure they are up to date as regards pollution abatement technology and techniques.

The Agencies and respective Secretaries of State will also have a duty to "have regard to the desirability" of conserving and enhancing the natural beauty, flora, fauna etc and of protecting or conserving buildings etc when considering proposals for pollution control. Both Agencies also have a general duty to have regard to the likely costs and benefits in the exercise of their powers.

Ministers are empowered to approve codes of practice which provide practical guidance and promote desirable practices with regard to discharging certain of their environmental duties.

Provision is made for the establishment of a Committee to advise the Secretary of State on the Agency's functions in Wales; the Agency (E&W) will also have a duty to establish regional Environment Protection Advisory Committees and regional or local fisheries advisory committees in England & Wales and to consult them as appropriate. SEPA is also required to establish regional boards.

NSCA's initial views on the proposed arrangements for the Agencies appear earlier in this issue of *Clean Air.*

- **Contaminated Land and Abandoned Mines:** Part II of the Bill amends the *Environmental Protection Act 1990* with the addition of "Part IIA – Contaminated Land"; a new "Chapter IIA" covering abandoned mines is added to the *Water Resources Act 1991.* See separate report in this section of *Clean Air.*

- **National Waste Strategy:** New sections 44A and 44B are added to the *Environmental Protection Act 1990* requiring the Secretary of State (in England & Wales) and SEPA to prepare statements as soon as possible setting out policies for waste disposal and recovery in England & Wales and Scotland, respectively.

- **Statutory Nuisance, Scotland:** Part IV and Schedule 14 of the Bill extends Part III of the *Environmental Protection Act 1990* (as amended by the *Noise and Statutory Nuisance Act 1993)* to Scotland; the appropriate sections of the *Public Health (Scotland) Act 1897* will be repealed, as well as the noise nuisance provisions of the *Control of Pollution Act 1974* and section 17 of the *Clean Air Act 1993* relating to smoke nuisances in Scotland.

NSCA's Scottish Division has welcomed the proposals to update Scottish nuisance legislation.

- **Control of Water Pollution, Scotland:** Part IV and Schedule 13 of the Bill adds to section 30 of the *Control of Pollution Act 1974* similar provisions to those already contained in the *Water Resources Act 1991* with regard to pollution offences, discharges to and from sewers, etc.

CONTAMINATED LAND

The outcome of the Government's Review of policy on contaminated land was published in November 1994. This follows the setting up of a review committee in March 1993, and the committee's preliminary views published in March 1994 in *Paying for Our Past* on which comments were invited (*Clean Air,* Vol 24, No. 2).

Framework for Contaminated Land sets out the Government's proposals for dealing with contaminated land and of liabilities; in particular the 'suitable for use' approach to the control and treatment of existing contamination is advocated and it is proposed that the new Environment Agency should play an important part in the prevention and abatement of contamination, including discharges from abandoned mines. It is also proposed that the Agency should be responsible for research and guidance designed to help businesses and regulators determine when remediation is required and to what level, striking an appropriate balance between the costs and the environmental benefits of any action.

Other legislative proposals which have been included in the Environment Bill include:

- regulators (the Environment Agency and the borough and district councils, or unitary authorities) to be able to require the prevention or abatement of contamination. However they will also be required to consider questions of hardship resulting from their enforcement of environmental obligations.
- mine operators to be under a duty to give the Agency six months' notice of any proposed abandonment.
- regulatory authorities to be responsible for identifying problems caused by contamination and establishing priorities for dealing with them. Thus a general register of land subject to potentially contaminative uses is not felt to be warranted, and section 143 of the *Environment Protection Act 1990* will be repealed.
- following concerns about water pollution from abandoned mines, legislative amendments will be proposed to remove the existing statutory defence and exemptions for mines abandoned after the end of 1999 so that the Agency will have the same powers for those mines as for other discharges.
- existing statutory provisions will be

clarified regarding extent of liability of financial institutions for damage caused by a client or company for whom they act.

PRESCRIBED PROCESSES

The *Environmental Protection (Authorisation of Processes) (Determination) Periods (Amendment) Order 1994* amends the 1991 Order: local authorities have nine months to determine applications for processes prescribed for their control as a result of the 1994 amendments to the *Prescribed Processes and Substances Regulations.* (The determination period was previously 12 months in England and Wales and 9 months in Scotland).

The application fee for processes in England and Wales with IPC authorisations as at 30 November 1994, transferring to LAAPC is £200.

PLANNING POLICY GUIDANCE

Two PPGs have recently been published.

PPG 23, *Planning and Pollution Control,* outlines the responsibilities of planners and their relationship with statutory pollution control bodies; it provides advice on avoiding duplication between and pollution control authorities; it also provides guidance on industrial developments posing a risk of pollution, waste treatment and disposal sites, and the redevelopment of contaminated land; there is also guidance on proposals for development near such sites.

The long awatited PPG 24, *Planning and Noise,* replaces DOE circular 10/73 of the same name. It provides local planning authorities with advice on how the planning system can help to minimise the adverse impact of noise and introduces the concept of noise exposure categories for residential developments.

Both PPGs are available from HMSO: PPG 23 – £6.15; PPG 24 – £6.90.

1,3-BUTADIENE AND CARBON MONOXIDE

The Government's independent Expert Panel on Air Quality Standards (EPAQS) have assessed available health and air quality data and have recommended an AQS of 1 ppb measured as a running annual average for 1,3-butadiene and 10 ppm measured as a running 8 hour average for carbon monoxide. In addition, the Panel also recommend that the standard for 1,3-butadiene, and the need for a target standard be reviewed after a maximum of five years in the light of additional human data; As a precautionary measure, the Government should aim to ensure that the standard is not exceeded at any monitoring sites and that overall concentrations decline.

1,3-butadiene is an organic compound which is known to cause cancer in humans. It is an important industrial chemical, being used particularly in the manufacture of synthetic rubber for tyres; some commercial liquid petroleum gases also contain up to 8% by volume. It is chiefly derived from burning petrol and diesel but can also come from house fires and the burning of other fossil fuels.

Carbon monoxide is produced in the process of combustion and kills people exposed to very high levels of it (e.g. fires in buildings, blockage of flues and faulty appliances.

The Government will be considering the EPAQS recommendations (together with their earlier recommendations on ozone and benzene) in the light of its overall strategy on air quality management. In the meantime, daily information on the levels of 1,3-butadiene in ambient air is to be provided to the public via the freephone air quality helpline and on CEEFAX and TELETEXT.

Both reports are available from HMSO at £5.95 each.

MEDIATION: BENEFITS AND PRACTICE

The Department of Environment has published (November 1994) an information paper which aims to encourage the use of mediation as an option for dealing with noise and other disputes. It has been widely circulated to local authorities, voluntary groups, housing associations and the police.

The paper makes the point that mediation is not a substitute for statutory nuisance action; however, in many cases mediation can be a quicker and more cost-effective way of tackling a range of neighbour nuisance disputes at an early stage and this avoiding formal action.

EUROPEAN UNION

On 1 January 1995, Austria, Finland and Sweden joined the EU bringing the number of member countries to 15. Also during January, the new Commission takes over with Jacques Santer as Commission President. The UK's two Commissioners are Sir Leon Brittan (part of the External Relations portfolio) and Neil Kinnock (Transport). Mrs. Ritt Bjerregaard (Denmark) takes over the Environment and Nuclear Security portfolio.

HMIP INFORMATION

HMIP has recently published six leaflets aimed at promoting public awareness of the Inspectorate, its structure, functions and duties:

- *HMIP Offices*, lists all offices, faxes and telephone numbers;
- *Monitoring* describes HMIP's Monitoring Branch;
- *ECOfacts*^{SM} describes HMIP's semi-automatic 24 hour public enquiry service;
- *Public Registers* says where the Registers are and the type of information they contain.
- *Technical Guidance* describes the Technical Guidance Branch;
- *Chemical Release Inventory* is a leaflet explaining the Inventory.

All leaflets are available from HMIP offices, free of charge.

RADON IN UK DWELLINGS

A recent report* from the NRPB estimates that almost 20% of the estimated 100,000 homes radon concentrations above the Government Action Level (200 Bq/m^3 of air) have now been identified.

While radon disperses easily outdoors, it is drawn into buildings through cracks and gaps in the floor where concentrations may lead to an increased risk of lung cancer. In this new report the NRPB describes the principles for defining radon Affected Areas, listing those areas already defined as being affected in Cornwall, Devon, Derbyshire, Northamptonshire, Somerset, parts of Grampian and the Highlands in Scotland and Down and Armagh in Northern Ireland. In such areas, it is suggested that local authorities will want to ensure radon preventative measures are included in new houses and that existing houses with high levels are identified and remedied.

Radon: no problem† is a new video from the Building Research Establishment; it offers householders and builders easy-to-follow guidance on reducing radon problems in homes. The video explains how measurements should be taken and discusses a range of remedial measures from simply sealing cracks and gaps and clearing airbricks to installing radon sumps. The 14 minute video also shows what radon remedial equipment looks like — an issue of concern to some householders.

**Radon Exposure in UK Dwellings*, G.M. Kendal et al. HMSO, £10.00.

†Video ref. AP/86, available from BRE Bookshop, Garston, Watford WD2 7JR, price £13.50 inc. p&p.

HMIP QUARTERLY STATISTICS

Figures in HMIP's report for the second quarter of 1994-95 (i.e. to 30 September 1994) show that a total of 1,842 applications for IPC authorisations have been received since 1 April 1991 and 1,517 authorisations issued. A total of 231 applications were received during the first two quarters of 1994-95 and 289 authorisations issued, leaving 325 outstanding from these and previous quarters.

Over 58% of applications received during the first two quarters of 1994-95 were determined within the four month period specified by legislation (52% in 1993-94); most of the delays were caused by insufficient information being submitted with the application and in these instances an extension to the determination period is agreed.

During the first two quarters of the year HMIP inspectors made 4,788 visits (target for 1994-95 — 6,000) to premises for which they have regulatory responsibility; most visits were to check on compliance with legislation. Inspectors have issued 2 prohibition notices, 3 improvement notices, 45 enforcement notices and undertaken 7 prosecutions.

BOOKS AND REPORTS

ENVIRONMENT INDUSTRY YEARBOOK 1995

The Environment Press, 1994. £69.00 (+ £3.00 p&p).

This year's edition of this comprehensive directory — covering markets, information sources, consultants and equipment and suppliers guide, classified and indexed for easy use.

ACID RAIN AND ACID WATERS, second edition.

G. Howells, Ellis Horwood, 1995, £60.00. ISBN 0133367517.

A factual account of acidic deposition and its impact on hydrological systems. The book has been updated to take into account the effects of controls on emissions in Europe and USA and the timescales for recovery of damaged ecosystems.

ALTERNATIVE ENGINES FOR ROAD VEHICLES
and
ALTERNATIVE FUEL FOR ROAD VEHICLES

M.L. Poulton, Computational Mechanics Publications, 1994, £59.00 each. ISBN 1853123005 and ISBN 1853123013.

These two complementary books are the consequence of a programme of study commissioned by the UK Department of Transport into the contribution of the vehicle to global warming. "Alternative Engines for Road Vehicles" contains 11 self contained chapters, describing all aspects of different engine technologies, with a summary chapter comparing relative performances. "Alternative fuels for Road Vehicles" looks at characteristics, emissions and costs of individual fuels. It gives a comparative evaluation of the fuels and an overview of health and environmental effects of emissions. These books provide a very useful summary of an important issue.

NON-CO_2 GREENHOUSE GASES – WHY AND HOW TO CONTROL?

Ed. J. van Ham, L.J.H.M. Janssen and R.J. Swart, Kluwer Academic Publishers, 1994. ISBN 079233049. For price contact J. van Ham, CLAN, Tel: (+31-15) 69 68 84.

Proceedings of an International Symposium held in Maastricht, The Netherlands, 13-15 December 1993. The book covers all aspects of non-CO_2 greenhouse gases – methane, nitrous oxide, CFCs, HCFCs, HFCs, tropospheric ozone and its precursors and discusses possible remedies to global warming.

ENVIRONMENTAL OXIDANTS

Ed. J.O. Nriagu, M.S. Simmons, Wiley Interscience, 1994, £74.00. ISBN 0471579289.

The book provides a broad based multidisciplinary study of the environmental chemistry and toxicology of oxidants as well as their increasing role in pollution control. Studies include ozone formation in urban plumes, effects of ozone in human studies, effects of oxidants on forests and oxidative stress and asbestos.

A DIY ENVIRONMENTAL REVIEW FOR COMPANIES

Business in the Environment, 1994, £34.00. ISBN 0952484609.

Produced with the assistance of Coopers and Lybrand, this practical workbook is written by business for business. It aims to guide any size of company through an environmental review.

MACMILLAN DICTIONARY OF THE ENVIRONMENT
Fourth edition

M. Allaby, Macmillan, 1994. £13.99. ISBN 0333616553.

The dictionary covers biological, geographical and geological terminology as well as environmental events, agencies and legislation. It is wide ranging and good value.

TRANSPORT IN TRANSITION
Lessons from the History of Energy

Stephen Peake, Earthscan, 1994, £12.95. ISBN 185383209X.

An examination of the environmental, energy and social impacts of transport growth in the UK and other developed countries. The author reviews trends in the relationship between transport activity and economic growth, explores the concept of transport efficiency and contrasts alternative scenarios for the development of UK transport to 2025.

URBAN ENVIRONMENTAL MANAGEMENT
Environmental Change and Urban Design

R.R. White, John Wiley, 1994. £31.95. ISBN 047190017.

This book offers planners an account of the dynamics of environmental change in relation to cities. It shows how short term localised planning is at the root of the environmental crisis in cities and considers how improvement in environmental quality and inequity in the city are related.

LOCAL ENVIRONMENTAL POLICIES AND STRATEGIES

Ed. J. Ageyman, B. Evans, Longman, 1994. £15.95. ISBN 0582229383.

Aimed at practitioners, academics and students in environmental policy, the book covers the new post Rio environmental agenda; environmental strategies, audit and management systems; environmental planning, planning for ecology and waste disposal; transport and energy planning. It provides a comprehensive overview by recognised experts, but there is substantial overlap in the content of the chapters and tighter editorial control could have produced a more concise volume.

AIR POLLUTION AND COMMUNITY HEALTH
A Critical Review and Data Sourcebook

F.W. Lipfert, International Thomson Publishing, 1994, £60.50. ISBN 0442014449.

The book re-evaluates epidemiological studies of the last 40 years to provide a coherent picture of the effects of air pollution on respiration, hospitalisation and mortality. The book is organised by health effect rather than pollutant and presents data from many of the epidemiological studies reviewed.

ENVIRONMENTAL MANAGEMENT HANDBOOK

B. Taylor et al, Pitman Publishing, 1994, £45.00. ISBN 0273601857.

Using case studies covering a range of businesses, the handbook is designed to give practical advice on incorporating environmental responsibility into business practice. It examines identification and monitoring environmental issues likely to impact on a business, analysing external trends, environmental management and audit and reviewing company objectives and values.

CCH ENVIRONMENT MANUAL

CCH Editions Limited, 1994, ISBN 08633253806. £168.00 pa, (includes 3 updates and 3 newsletters), plus £6.00 delivery charge.

This looseleaf manual is written by a team of environmental specialists working for UK law firm, Eversheds. Aimed at helping businesses to comply with environmental legislation, it covers all areas of pollution control, as well statutory nuisances, risk management and criminal liability – in England and Wales only; neither Scotland nor Northern Ireland are included. While the manual does contain a lot of useful information and overview of legislative requirements, most of it can be found elsewhere for considerably less than £168.00 pa.

10th IUAPPA WORLD CLEAN AIR CONGRESS and Exhibition

28 May-2 June 1995
ESPOO · FINLAND

GROWING CHALLENGES – FROM LOCAL TO GLOBAL

500 papers from 45 countries have been selected for presentation at the 10th World Clean Air Congress focussing on the following aspects of air pollution prevention:

- emissions and control
- atmospheric pollution
- pollutant impacts
- pollution management
- human exposure and effects
- growing challenges

The Congress, which has been organised by the Finnish Air Pollution Prevention Society, includes a commercial exhibtiion of services and products related to air pollution control, as well as a number of technical visits. The Registration fee which includes access to all sessions and the exhibition, all Congress materials, technical excursion and various social events is FIM 2300 until 15 February (FIM 1900 for additional delegates from the same organisation); FIM 2700 after 15 February and FIM 600 for accompanying persons.

In addition, the Congress organisers have arranged optional pre and post Congress tours to St. Petersburg (25-28 May), Estonia (2-5 June) and Lapland (2-4 June).

For more details and registration document contact

Ms Suvi Saxén
Congress Management Systems Ltd
PO Box 151
FIN-00141 Helsinki

Tel: +358-0-175355 Fax: +358-0-170122

FUTURE EVENTS

21 FEBRUARY – DUTY OF CARE
One day course providing a thorough basic understanding of the legislation and the code of practice relating to the duty of care and the registration of waste carriers.
Venue: Wast Hills House, Kings Norton, Birmingham.
Details: IWM Business Services Ltd, Tel: 01604 20426.

7 MARCH – WASTE LEGISLATION (GENERAL)
The programme of this course covers waste management in the context of environmental law, the basic structure under Part II of the EPA, duty of care, registration of waste carriers, wastes management licences and implications of current and proposed EC directives.
Venue: Stakis Bath Hotel, Bath.
Details: IWM Business Services Ltd, Tel: 01604 20426.

27-28 MARCH – MANAGEMENT OF ENVIRONMENTAL AUDITS
Short course being organised by Centre for Hazard and Risk Management at Loughborough University of Technology.
Venue: Loughborough.
Details: Joyce Motyka, Fax: 01509 610361.

27-29 MARCH – ENVIRONMENTAL ANALYSIS
Course covering air pollution monitoring and the analysis and treatibility of water, effluent, sludge, and contaminated soil for many different pollutants. The course is suitable for both chemists and non-chemists.
Venue: University College of North Wales, Bangor.
Details: Jane Davies, BETA Specialists, Menai Technology Enterprise Centre, Fax: 01248 352497.

29-30 MARCH – NSCA SPRING WORKSHOP
Local air quality management – from concept to reality. For details of programme see advertisement in this issue of *Clean Air.*
Venue: Moat House, Northampton.
Details: NSCA, Fax: 01273 326313.

4-5 APRIL – MANAGEMENT OF IPC AUTHORISATIONS
Short course being organised by Centre for Hazard and Risk Management at Loughborough Universtiy of Technology.
Details: Joyce Motyka, Fax: 01509 610361

6 APRIL – MANAGING ENVIRONMENTAL INCIDENTS
Course aimed at helping directors and managers identify and address the problems of vulnerability which may exist in their own organisation in the following areas:

understanding and successfully handling post-incident media interest; post incident impact of the law and regulators; environmental risk assessment and management.
Venue: The University of Leeds.
Details: Miss Julie Charlton, Dept of Fuel & Energy, Fax: 0113 233 2511.

10-12 APRIL – FUNDAMENTALS OF DISPERSION MODELLING

This course will explain why dispersion modelling is performed, the role of meteorology, and the bases for estimating pollutant concentrations produced by various source types.
Venue: London.
Details: Trinity Consultants, Dallas, Fax: 00-1 214 385 9203.

11-13 SEPTEMBER – 18th INTERNATIONAL CONGRESS FOR NOISE ABATEMENT

The overall theme of the Congress is *Traffic Noise in Europe* but the programme will also cover acoustics. There will be an exhibition of scientific instruments, software and acoustical material.
Venue: University of Bologna, Italy.
Details: Willy Aecherli, International Association Against Noise (AICB), Mirschenplatz 7, CH 6004 Luzern. Fax: +41-41 52 90 93.

CONFERENCE

Successful Climate Protection Policies in European Cities

3-5 April 1995
Berlin

On the occasion of the UN Conference on Climate Change in Berlin in March-April 1995, the European Academy of Urban Environment together with the Alianca del Clima, the Berlin Ministry of Urban Development and Environmental Protection, and the Free University of Berlin will organise a conference on successful climate protection policies in European cities.

Centered around six workshops, which focus on urban energy efficiency, conservation and urban transport, the conference will present and discuss initiatives of European cities who are taking the lead in climate protection. It addresses members of city administrations, politicians, managers of energy utilities, as well as NGOs concerned with energy and the environment. The aim is to facilitate an intensive exchange of policy experience among professionals and to identify the essential motivations, political instruments and participants of successful policies.

The working languages will be English and German.

For further information please contact:
Free University of Berlin
Research Unit for Environmental Policy
Malteserstraße 74-100
D-12249 Berlin
Phone: +49 30 7792 250
Fax: +49 30 776 20 81

NSCA Pollution Handbook
1995 EDITION

Have you ordered your copy yet?

The Pollution Handbook contains separate chapters on integrated pollution control, air, noise, waste and water pollution.

Details of relevant European Union measures are summarised as well as the principles of control and enforcement. General information is also given on control methods.

Detailed appendices list prescribed processes and substances; smoke control orders and authorised fuels; EU Directives and water quality objectives. The Handbook is indexed.

ISBN 0 903474 37 9, A5, 500 pages, soft covers - £23.95

Telephone orders accepted with
Master Card, Visa and Amex on 01273 326313

National Society for Clean Air and Environmental Protection
136 North Street - Brighton BN1 1RG

NSCA 1995 SPRING WORKSHOP

LOCAL AIR QUALITY MANAGEMENT - from concept to reality

Northampton Moat House
Wednesday 29 & Thursday 30 March 1995

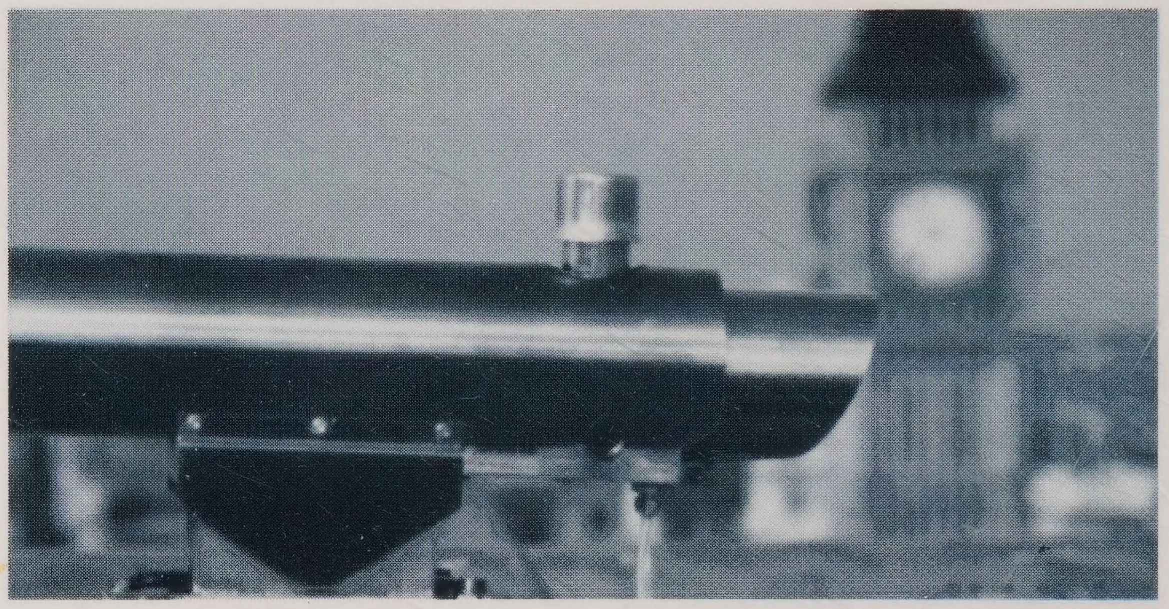
A workshop for people who expect to be involved in improving air quality at a local level, and who need a full briefing with the emphasis on practicalities.

For a copy of the workshop brochure please contact the Society on 01273 326313

NSCA TEACHING PACKS - ALL AT £5.00 EACH

Air Pollution - Key Stage II-III, A4, 26 sheets + A3 poster. 1993
Noise Pollution - Key Stage II-III, A4, 18 sheets + 2 A3 posters. 1993
Acid Rain - Key Stage III-IV, A4, 40 sheets. 1992
Global Warming - Key Stage III-IV, A4, 26 sheets. 1995

Air quality measurement -
for those who most need to know.



For any organisation that needs to manage its air quality, managing starts with measuring.

OPSIS is one of the most widely used air quality monitoring systems in Europe. It is the system of choice, and for all the right reasons. It is versatile, capable of targeting multiple airborne pollutants and hydrocarbons over as many as 12 lightpaths at once. This also enables the monitoring for emissions in several streams in a process, or multiple stacks. It is reliable, operating without contact with the sample, avoiding chemical reaction or corrosive damage . It needs minimal maintenance, reducing intervention and downtime. It is cost-effective and proven in performance. TÜV, UMEG and US EPA have all approved the system.

OPSIS systems are today measuring ambient concentrations of sulphur and nitrogen oxides, benzene, toluene and other gases. In industry, OPSIS is used for continuously measuring emissions of pollutants such as hydrogen chloride, mercury vapour and ammonia, as well as the more common pollutants and combustion gases. Upgrading for extra gases can always be carried out, even when the system is installed and in operation.

Sensors linked to the OPSIS system will accept data from multiple inputs to give a full range of display, reporting and statistical functions. OPSIS software accepts meteorological data, alongside ambient air quality measurements, for meaningful reporting. For emissions monitoring, process control parameters such as flow, temperature and pressure can be incorporated.

Whether measuring the ambient environment or continuous emissions, OPSIS provides the ideal solution.

Turning measurement into management.

Enviro Technology Services plc
Environment House, Dudbridge Road, Stroud, Glos GL5 3EE
Tel 0453 751641 Fax 0453 757596